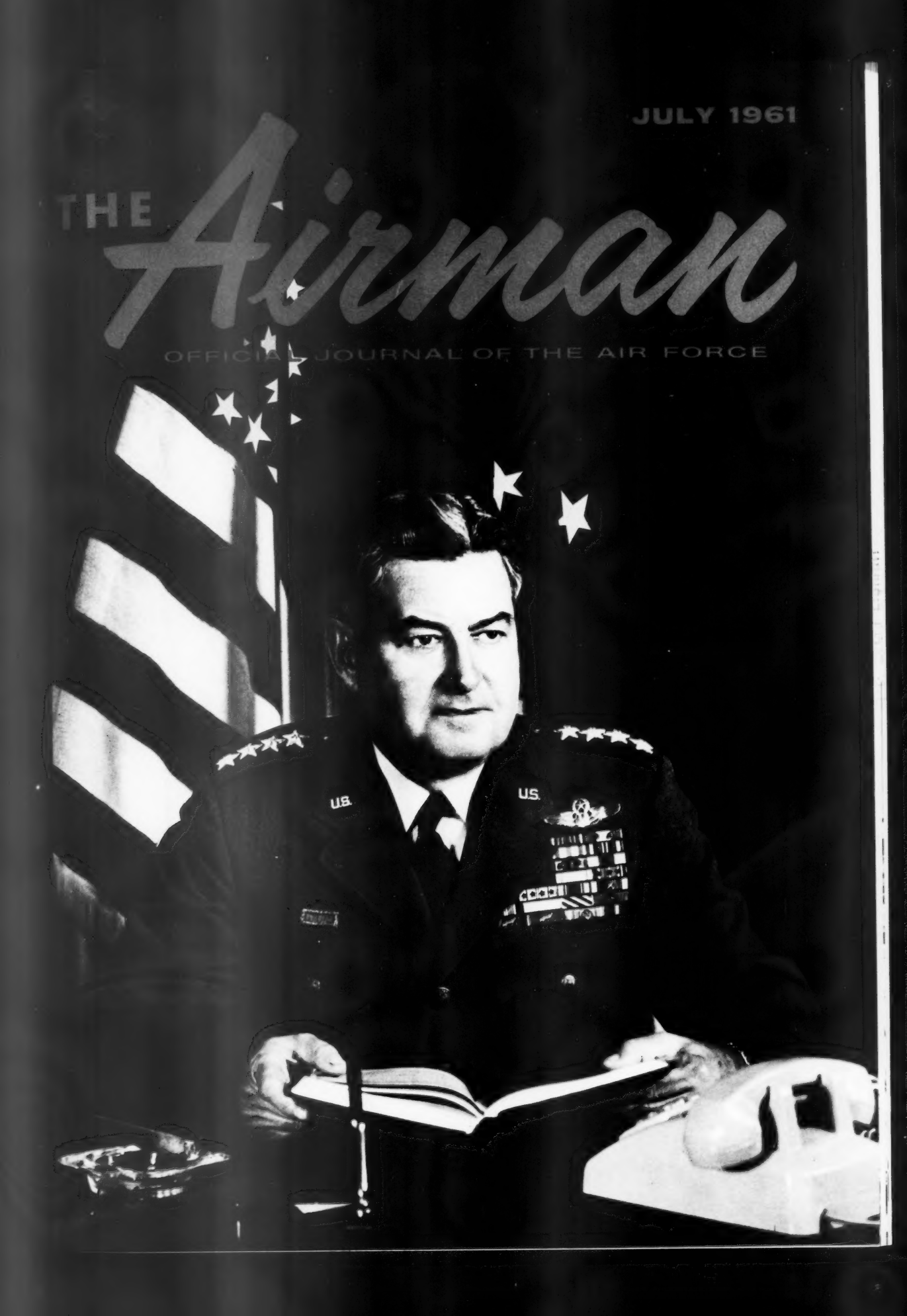
JULY 1961

THE Airman

OFFICIAL JOURNAL OF THE AIR FORCE



FULFILLMENT

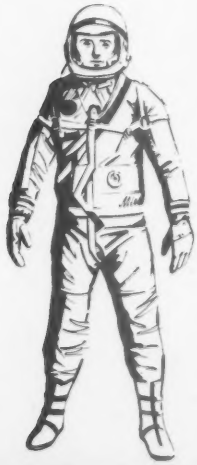
Space vehicle poised on planet Earth,
Man of faith occupies its berth.
His choice was great; his name shall also be,
Succeed or fail in his passage to immortality.
So call him mighty! Inscribe his name first.
In the bright Valhalla of the Universe.

Countdown ended, zero hour arrives,
Astronaut begins his conquest of the skies.
The giant spaceship escapes its mooring,
Destination–worlds ripe for man's exploring.
With rumblings that echo through the launching site
Vulcan's flaming spacecraft begins its flight.

Then, faster its movement than eye can trace,
The space traveler streaks upward into space.
Beyond gravity's pull, driven by nature's force,
Earth's satellite follows its circuitous course.
The celestial pilgrim stirs with high elation,
Encircling the earth, embracing God's creation.

Infinite God! Indomitable man!
Man reached up; God grasped his hand.

L. R. Priest
Chaplain, Colonel, USAF
Air Training Command



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OFFICIAL JOURNAL OF THE AIR FORCE

olume V, Number 7 July 1961

Director of Information, Office of the Secretary of the Air Force, Maj. Gen. ARNO H. LUEHMAN. *Chief, Internal Information,* Col. ROGER B. PAYNE. *Editor,* Lt. Col. HARMON H. HARPER. *Assistant Editor,* Maj. ROBERT J. FLANAGAN. *Managing Editor,* TED R. STURM. *Departmental Editor,* SMSgt. HAROLD E. BAMFORD. *Art Director,* SMSgt. LESTER B. BOUNDS. *Production and Distribution.* RUSSELL M. WOODS.

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THE AIRMAN is primarily a medium for the exchange of ideas and information ong Air Force personnel. Readers are encouraged to submit articles, short subts, photographs, and artwork. All contributions will be given consideration; ggestions and criticisms are welcomed. Opinions expressed by individual conbutors do not necessarily reflect the official viewpoint of the Department of the r Force. All photographs are official USAF photos unless otherwise designated.

LETTERS TO THE EDITOR

Open Letter

Dozens of readers wrote to us about the April article Serial Numbers Tell All. *They pointed out a variety of errors, all of which are acknowledged. The item was obtained from an outside source and, as the readers informed us, was obviously written years ago. It slipped by without our usual check. Help us forget it ever happened.*

★ ★ ★

Runaway Prop

Sir: Never have I read a more thrilling story than *Runaway Prop* in the April issue. At the same time, it presented some very useful information for passengers who are exposed to such an experience. Educational efforts of this type remove a lot of passenger anxiety and help to sustain confidence in USAF crews.

Lt. Col. Lonnie C. Brewer
APO 633, New York, N. Y.

Sir: *Runaway Prop* was excellent but it failed to give credit to the copilot who occupied the right seat for the first four hours of the flight and the last six hours of the emergency. Lt. (now Capt.) Sterling D. Hays took the right seat after the prop loss on number one engine. From the crew washroom, he had seen the prop come off and spin toward him. Shortly afterward, he resumed his duties and stayed there until the flight was completed. All official documents list him as copilot and Lieutenant Lambert as third pilot.

Capt. Richard C. Lilygren
APO 794, New York, N. Y.

• *Thanks to Captain Lilygren, we are able to offer credit where due.*

★ ★ ★

Future Teachers

Sir: Thanks for your excellent article *Teaching Tomorrow* in your April issue. Our department will welcome inquiries about certification requirements for teaching in Colorado. They may write to me in care of the Department of Education, Office of the Commissioner of Education.

Otto G. Ruff
Denver, Colo.

(Continued on page 27)

★ ★ ★

FRONT COVER: Chief of Staff, USAF, General Curtis E. LeMay.

CIVIL AIR PATROL

Air Force Junior Partner

can point proudly to two decades of public service.

by

THE MENTAL PICTURE MOST LAYMEN HAVE of Civil Air Patrol is that of a bright, propeller-driven civilian plane searching low over craggy terrain.

This image is quite accurate, as far as it goes. It must, however, be multiplied many thousands of times and amplified by CAP's other concepts for one to realize that this adult-youth organization is as full of promise in its own right as a *Redstone* capsule.

Presenting a new profile at this midpoint of its 20th anniversary year, the volunteer Civil Air Patrol is:

- In the midst of an unprecedented aircraft owner-pilot specialist recruitment program, to swell its search-rescue and emergency on-call capabilities to far beyond its volunteer membership peak in World War II;
- Expanding its national cadet activities by adding attractive week-long aerospace courses, and stimulating teen-age interest with a goal of at least doubling the present 35,000-member cadet roll this calendar year;
- Spreading its aerospace teacher workshop program to more than 100* colleges and universities this summer; adding USAF reservists to the working roster of instructors, technicians, and assistants to workshop directors, and helping to put aerospace education in the curricula of more than 600 schools by next year.

Its wealth of experience in organized flying makes Civil Air Patrol an ideal proving ground for civilian aircraft pilots who some day may again face an acid test of national civilian defense, as their predecessors did 20 years ago. Here in CAP, with veteran mission pilots, they can practice disciplined flying that exacts the maximum from every minute in the air search.

*Editor's note: Late report from CAP National Headquarters has 117 workshops scheduled for summer and fall 1961.

Most of these non-CAP adult aviators, many with their military stint behind, have arrived at an economic level that is fast-paced and demanding. There is little time for other than professional, business, or personal affairs.

Ever since Civil Air Patrol performed its many World War II volunteer duties as flying civilians helping the military on home shores, the CAP organization has become famous for its search and rescue missions, its stick-to-itiveness in emergencies. As the war became history, many of those who worked round the clock as submarine spotters, couriers, communicators, border surveillance patrols, and at a myriad of other semimilitary tasks, felt they were no longer needed in the national effort. They therefore assumed the normal post-war lives. Many diverted their flying interests to aero clubs; others remained active in the peace-loving CAP and held the nationwide outfit together. They worked to make it what it is today, a federally chartered benevolent corporation and civilian auxiliary of the U. S. Air Force.

Many of those original CAP members still are active today. In fact, the present chairman of the corporation's national board is CAP Col. William C. Whelen of Jacksonville, Fla. Back in those dark war days, he flew coastal patrols out of Pascagoula, Miss. Others have retired.

There is a present-day need for a nation peppered with light, on-call aircraft manned by specialized mission pilots. To meet this need, CAP has established the Owner-Pilot Specialist (OPS) parcel of CAP Emergency Services. This is now the nomenclature for the mission-pilot membership of CAP which has long been functioning, but which is now supplemented by the

by Brig. Gen. STEPHEN D. McELROY, USAF
National Commander Civil Air Patrol

owner-pilot specialists, and a designated Director of Emergency Services for each of CAP's 52 wings. This directorate, manned by a veteran CAP 4,000-hour mission pilot, is a new CAP position. It will coordinate this new blend of uniformed CAP aviators and the non-uniformed specialists.

Aerial searchers and ground rescue teams of CAP each year show excellent performance records. CAP planes have flown consistently, year by year, at least 50 percent of the sorties of all the military and other civilian agencies combined. During calendar year 1960, CAP flew more than 60 percent, spending 20,000 hours in the air; it flew 216 missions (9,873 sorties) authorized by the Air Force, and was credited with saving 107 lives.

The only compensation received by these pilots was reimbursement for fuel and lubricants used to operate their planes on assigned missions.

Emergency Services' primary interest is air search but it has a multitude of other chores, each vital in the big civilian emergency and defense machine. The owner-pilot specialist corps is designed to retrieve for CAP, and the national welfare, the nonaffiliated adult pilot. It will give him mission training and subsequent air search and other emergency assignments, yet leave him free from routine CAP membership requirements, including the wearing of the CAP uniform.

Already acquiring owner-pilot specialist members in various sections of the country, CAP Emergency Services still has a relatively small, nationwide light plane fleet of a little more than 4,000 aircraft, and about 8,000 licensed pilots.

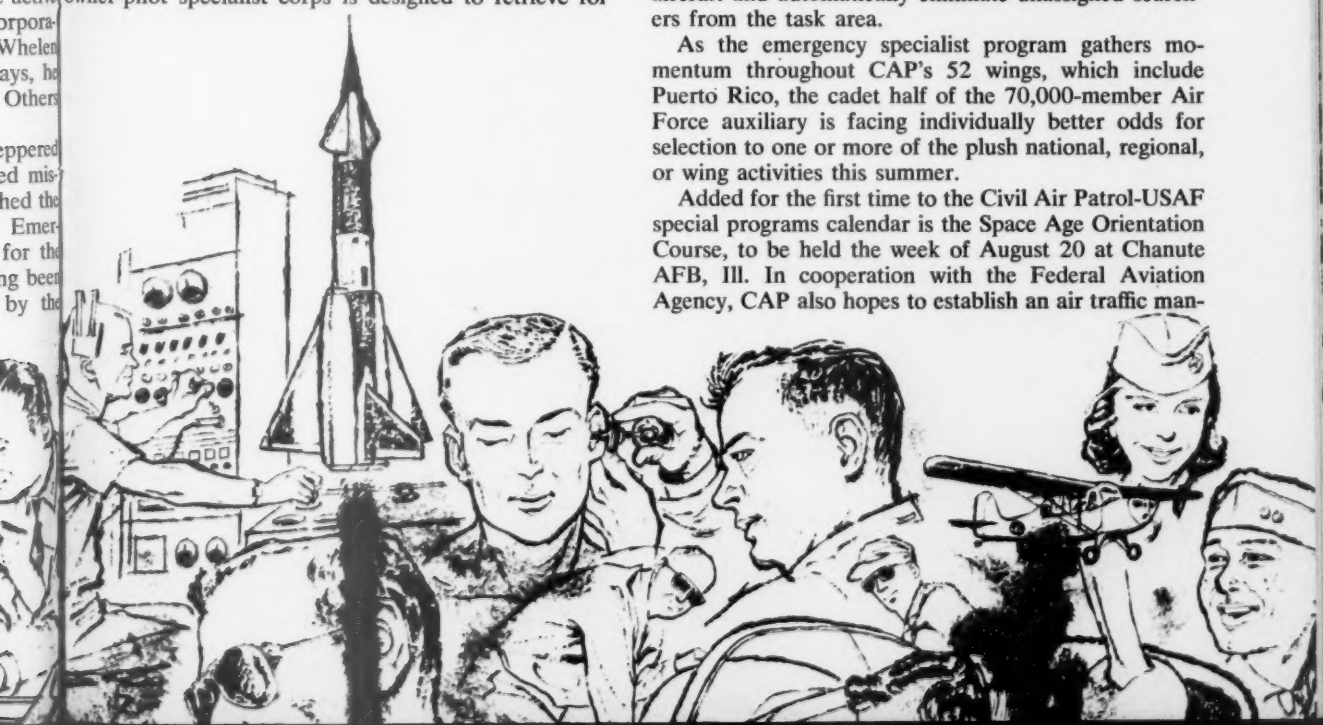
The United States has a tremendous resource in private pilots and light aircraft. No other country in the world possesses civilian pilots and flying equipment in such quantity. Were these to unite with CAP Emergency Services, this country would have an organized light plane fleet of a utopian 70,000, the number of such aircraft reported to be active by the Federal Aviation Agency. The FAA also reports 350,000 licensed pilots.

It is obvious that in planning for reaction to disaster, either localized or nation-wide, the capability which this country possesses now in this fleet of light aircraft would not be overlooked. Ideally, all of these planes and pilots could already be mission-trained and adapted to the CAP Emergency Services organization in each state wing—a ready task force of considerable magnitude, easily meshed into the national civilian defense operation.

These specialists would work with fellow CAP members and train in flying the various types of proven search patterns for certain terrain. They would operate under an assigned CAP mission commander in the area, who maintains a current mission kit, enabling him to establish an immediate, systematically plotted air and ground search with minimum of overlap and maximum concentration. With these specialists on call, the commander could assign search sectors to individual aircraft and automatically eliminate unassigned searchers from the task area.

As the emergency specialist program gathers momentum throughout CAP's 52 wings, which include Puerto Rico, the cadet half of the 70,000-member Air Force auxiliary is facing individually better odds for selection to one or more of the plush national, regional, or wing activities this summer.

Added for the first time to the Civil Air Patrol-USAF special programs calendar is the Space Age Orientation Course, to be held the week of August 20 at Chanute AFB, Ill. In cooperation with the Federal Aviation Agency, CAP also hopes to establish an air traffic man-



Jet orientation courses for CAP youngsters have been conducted at Air Force bases for a number of years.

agement course for cadets at the FAA's Aeronautical Center at Will Rogers Field, Oklahoma City. This is still in the planning stage.

The new space course, as planned by the Technical Training Center at Chanute, will give a selected honor male cadet from each CAP wing an insight to ballistic and nonballistic missiles, to rockets and propellants currently in use by the Air Force. Five senior escort officers of CAP will attend with the cadet contingent, one will command the training unit, and the others will serve as flight monitors—a four-way division of the group to facilitate instruction.

Qualifications are high, for both cadets and seniors. All must possess the CAP Certificate of Proficiency and, in addition, the cadets must have completed a successful year of high school chemistry or physics and must pass an examination of *The Dawning Space Age*, an advanced Civil Air Patrol textbook. The seniors must have at least a year of continuous active work with the CAP cadet program while cadets must have 18 months of active CAP service.

Lt. Gen. James E. Briggs, ATC commander, and Maj. Gen. Lloyd Hopwood, Chanute's TTC commander, have given full support to this new CAP course and experts of the 3345th Technical School there plan to train their civilian brothers in the same manner as regular Air Force students.

The actual course will last five days and the cadets and escorts will be flown to Chanute in USAF aircraft. A day-by-day program has been scheduled including basic indoctrination on missile propellants, pressure gases, and safety precautions; production and handling of cold liquids—cryogenics—and actual fueling operations; the complex process, from fueling to fusion to ignition, will be demonstrated by training devices and later they will witness test firing of rockets in observer cells. Included in the training schedule will be studies of the nonballistic systems of the *Hound Dog* and *Bomarc*, and the ballistic missiles *Thor*, *Atlas*, and *Minuteman*. "Man in Space," space navigation, and the future possibilities of space flight are to receive particular emphasis, school officials said.

This course parallels in interest and excitement for the CAP youngsters the two jet courses in existence for the past several years, the Jet Orientation Course for male cadets at Perrin AFB, Tex., and the Jet Age Orientation Course for girls at Maxwell AFB, Ala.

Both of these jet courses also will be held in August, meaning a specially busy month for CAP-USAF and personnel of the three bases involved.

In addition to all these activities, CAP's annual International Air Cadet Exchange with 19 countries will be in progress, involving 135 CAP cadets and a like number of foreign aero club boys and adult escorts.

This exchange program beginning in mid-July, is in operation for about a month while our cadets visit the foreign countries and the foreign young men are guests of CAP in New York and Washington and of 19 CAP state wings.

This International Air Cadet Exchange, which began in 1948 between the United States and Canada, has had as many as 23 countries participating in one year. The attendance fluctuates somewhat from year to year, due to the political situation in some nations and the economic status of some of the foreign aero organizations, but has an average of 19 nations. Nature affects the exchange, too, such as last year's earthquake in Chile, which forced her to withdraw; there was the Lebanon crisis a few years ago which halted temporarily the participation of Greece, Turkey, and Israel.

Another event is the National Drill Competition—the oldest of CAP special cadet activities. Last year for the first time, the competition was transferred from Rockefeller Plaza, New York City, to the Air Force Academy where 250 cadets of winning teams from each of CAP's eight regions, plus Hawaii and Puerto Rico, gave a spectacular performance in the Cadet Court of Honor. Six academy first classmen (all former CAP cadets) were the judges. The crack drill cadets represent 10 teams of 18 members and a drill commander each, plus alternate team members. It will be a big week at the academy for the regional winners again this summer with competition keener than ever. Last year, the all-girl outfit from Pueblo, Colo., won over the favorite Hawaii group (1957 and 1959 national champions) which placed second, and another team of girls from Ohio took third place.

In addition to these national and international events for CAP cadets, thousands more young men and women enjoy exchanges between wings and region; there are summer encampments and competitions within their own echelons.

Last year 41 Air Force bases were hosts to 6,266 cadets at summer encampments. At last reading, CAP wings estimate that more than 9,500 cadets will encamp this summer. It is anticipated that perhaps 43 bases will be involved in the program.

Some regions have their own training courses in addition to those prescribed by the national CAP program. Good example is an airline hostess training program sponsored by Great Lakes Region, where aviation-minded young women learn rudimentary aviation and the fine points of poise and service that may lead to stewardess jobs with commercial airlines.

All of these activities and events are geared to fit the member—seniors and cadets—into the general aerospace educational pattern that is the Number One long-term project of the CAP organization today.

The importance of aerospace education for youth cannot be over-emphasized. It is an aerospace age in which we live. Preparation for an aerospace-age future is vital; it starts even with kindergarten in elementary schools over the nation, some of which have had teachers fortunate enough to attend one or more of the aerospace education workshops our national headquarters staff has established each year. There were 66 of these workshops last summer—3,000 teachers attending—and the coming summer will see more than 100 such workshops in operation in colleges and universities throughout the nation. More than 100,000 teachers have attended CAP summer workshops to date. Usually, after CAP educators establish a college workshop, it carries on from year to year under its own director.

The workshops' value as vehicles to instill air and space thinking into elementary and high schools today is not disputed. Aviation and space knowledge is infectious; those workshop teachers spread their interest to their fellows, and it multiplies.

The national commander of American Legion has given full endorsement to CAP-USAF's aerospace education program, offering all possible assistance through his committees. Joining this giant organization in support of CAP are the National Aeronautics and Space Administration, the Federal Aviation Agency, and the National Aviation Education Council; all of these influential and top-level technical organizations are behind Civil Air Patrol in pursuance of its education plans.

CAP has a national staff of professional civilian aerospace educationists, one in each of the eight regions, and a "home office" organization at the Ellington AFB national CAP headquarters directing the expanding program.

Each of the regional educators is responsible for the state wings of his area and, so far, has been successful in placing CAP aerospace courses in 520 high schools as science electives for which students receive course credit. In addition, hundreds more of the nation's elementary schools—enhanced by summer workshop "graduate" teachers—have regularly instituted "enrichment" and Junior high "in-service" courses in aviation and astronautics that begin with folded-paper planes of the very young to advanced models built by older students, and to problems of aerospace power studies.

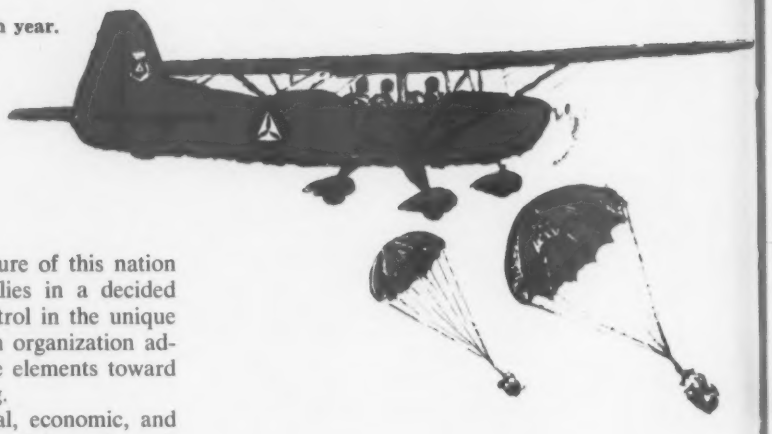
Goal for 1961 is to top the 600 mark for high schools having aerospace education as part of their course of study.

Civil Air Patrol publishes seven aerospace textbooks, and certain required study and examination enables CAP members to attain the Certificate of Proficiency, a sort of diploma that puts its owner ahead of his other fellows, and makes him eligible for special activities. The Air Force recognizes the certificate, too, and permits the honor cadet to enlist with the one stripe of airman third class, skipping the recruit category. In addition, instructors' and teachers' manuals are published by CAP to assist in teaching aerospace subjects in the various school systems. The same CAP texts used by members are used by nonmember students.

The objective of CAP's aerospace education program is to amplify the position of aerospace activities in the thinking of the American public by awakening interest and support of aerospace as a living part of our everyday existence. This is closely knit with the overall mission of Civil Air Patrol which, of course, includes its search and rescue activities and humanitarian services in the air and on the ground.

The importance of aerospace education for youth cannot be over-emphasized. It is an aerospace age in which we live. Preparation for the future is vital.

Aerial search teams of CAP show excellent performance records each year. CAP was credited with saving 107 lives in calendar 1960.



The indisputable fact, that the future of this nation —and the world, for that matter—lies in a decided accent on youth, places Civil Air Patrol in the unique position as the leading national youth organization advancing air and space knowledge, the elements toward which we must gear youth's thinking.

The impact of aerospace, its social, economic, and political implications, must be felt by adults and youth alike in order for our coming generation to keep comprehensively apace with the advancements now taking place in our own country and the rest of the world.

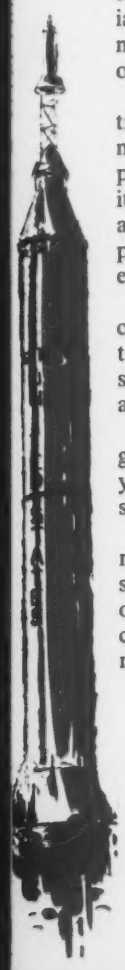
Notice, for example, in trade publications and the daily press, the increasing demand for skilled scientists in various fields. The need for electronics engineers in the federal government is boldly advertised every month. Technicians of every description are required today in many government-contracted projects by civilian manufacturers. A score of specialized manufacturers may be required to make the parts for a single stage of an experimental rocket.

Civil Air Patrol cannot hope to teach advanced intricacies of the aerospace age to its youngsters. It would not attempt to go further than to give cadets the exposure within its, and its Air Force partner's, capabilities that will provide him with the perspective of air and space that may, as his classic or scientific education progresses, tend to guide him to a productive field of endeavor compatible with the era in which he lives.

This seeming potpourri of foreign exchange, drill competition, jet flying, aircraft control, space orientation, and all the other elements of Civil Air Patrol, simmer into a huge, comprehensive entree that is quite appealing to young appetites.

Take a nation of aviation- and space-minded youth, guided by similarly inclined adults with foresight, and you have a vigorous combination most apt to be felt strongly in the future.

In recent months, steps have been taken to consummate in each CAP wing a working agreement with each state Civil Defense Agency that will mean instant, coordinated mobilization of CD-CAP forces in American communities in the event of a nuclear holocaust. A number of wings have accomplished this.



The new space course will give a selected male honor cadet from each CAP wing an insight to ballistic missiles, rockets, and propellants used by the Air Force.

It is a natural combination, for the civilian CAP provides trained, disciplined men, women, boys, and girls in nearly 2,000 units from coast to coast, in Alaska, Hawaii, and Puerto Rico, who can be rallied at a single signal. They would help maintain order and direct the unorganized civilians into channels of survival; their vehicles and communications equipment would be of significant value in relaying supplies and keeping in touch with the rest of the nation.

The thousands of light CAP aircraft and their disciplined pilots would be standing by to move blood, oxygen, doctors, and equipment to stricken areas.

Civil Air Patrol has a self-evident niche of importance in both peace and war. It should not be necessary for another world conflict to come before there are civilian forces adequate to combat it through survival on the home front.

The Office of Civil and Defense Mobilization provides the basic direction for such an operation in each state. On its heels is CAP, likewise available and already tuned to emergencies. Good example of the emergency prowess of CAP occurred during last year's Hurricane Donna. The devastation wrought in Florida and up the eastern seaboard was met instantly with CAP's ability to recoup and to keep loss and suffering to a minimum. Even then, CAP and Civil Defense displayed a working team in a number of dramatic cases where power was restored in hospitals, and vital refrigeration and communications lanes were kept open by little CAP radio stations.

This year on December 1, Civil Air Patrol marks its 20th birthday. It is at the edge of its plateau of development, as the psychologists say of an individual. The only way to go now is *up,* stimulated by fresh thinking by its leaders, and the coordinated support of the American public.

Past teen-age now, CAP has a look of maturity. Even a cursory glance at comparison charts denoting the various operations of the organization show graph lines ascending, some fast, some slow—but ascending. This means gain, or "profit," and even a *nonprofit* corporation like CAP relishes that.

We will hear your Statement.

In the first two or three months of every year, officers of the Armed Services appear before the Subcommittee on Department of Defense Appropriations.

To this group, which is part of the Committee on Appropriations, House of Representatives, the people from the Army, Navy, and Air Force present their complete budgets for the coming fiscal year's operations.

It is never a cut-and-dried procedure. Items presented must be justified with complete, explanatory statements. Then committee members question the briefing officers closely.

One of the officers appearing before the committee, which began Air Force hearings on February 29, was Maj. Gen. E. S. Ligon, Jr., Director of Personnel Planning, Hq USAF. The major portions of his prepared statement reflect an accurate picture of many major personnel problems which will face the Air Force during FY 1962.

Because this subject affects every member of the Air Force, THE AIRMAN in the following pages presents most of General Ligon's statement. It is in two parts: the first deals with overall personnel matters and specific areas concerning officer personnel. The second includes areas related to airmen and aviation cadets.

There is a third part of this story. Although the data is not from General Ligon's statement, it deals directly with it. It includes some representative questions committee members asked General Ligon when he completed his presentation. Besides containing some additional, pertinent information, it is indicative of what transpires when members of the Air Staff make their annual trek to Capitol Hill.

REP. GEORGE W. ANDREWS
State of Alabama

"General Ligon, do e a st
"Yes sir, Mr. Chair ve a
"You represent mil sonne
"Yes sir."
"Without interruptio

We will hea

Mr. Chairman and members of the committee, I welcome the opportunity to appear before you today to present the Air Force military personnel budget program for fiscal year 1962. This program has been developed in a personnel environment which is less optimistic than last year.

There has been a marked decline in retention of first-term airmen, and retention of young officers continues to be much lower than desired. If the program to be presented and the legislative actions I will refer to are not successful in improving retention, the Air Force will find it very difficult to build and maintain the high-quality professional force it needs to operate today's complex weapons systems.

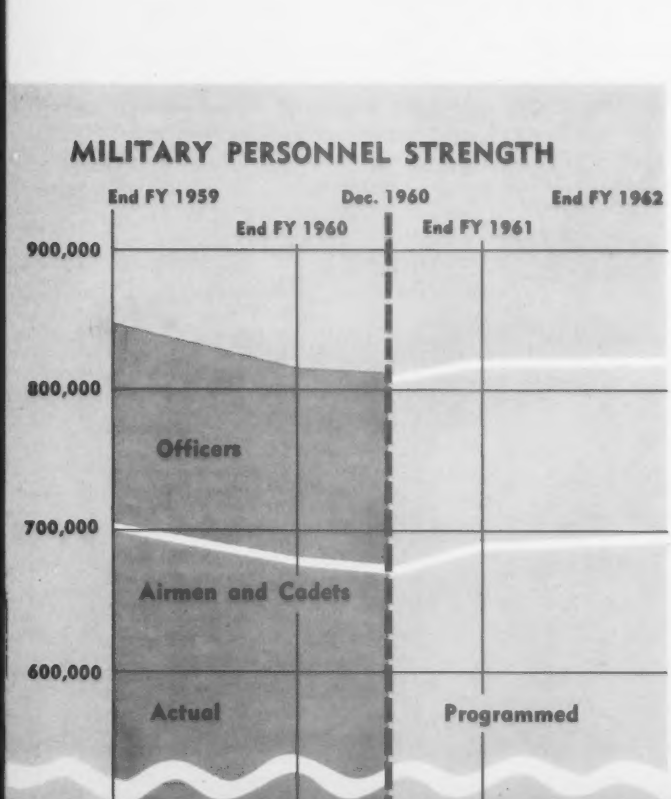
The funds to support the Air Force military personnel program for fiscal year 1962 are estimated to be $4,088 million. We are requesting an appropriation of $4,063 million of new obligation authority and, in addition, transfer authority of $25 million from the Air Force stock fund for a total of $4,088 million.

PERSONNEL STRENGTH SUMMARY

As an introduction to the program to be presented, a brief review of military personnel strength during the past two years is shown on Chart 1.

The Air Force program presented last year called for a reduction in strength during fiscal year 1960 from 840,435 to 825,000 and this lower strength was to be maintained through fiscal year 1961. However, the actual strength at end fiscal year 1960 was 814,752, more than 10,000 below authorization.

The end fiscal year 1961 objective has been reduced by 2,100 to 822,900 through inactivation of one B-47 wing. The fiscal year 1962 budget program I will present today also ends with 822,900. It includes 126,700 officers and 696,200 airmen and cadets. The man-year average strength for fiscal year 1962 is programmed at 824,000, an increase of 8,000 over fiscal year 1961.



Fiscal Year 1961 Military Personnel Operating Program

Before discussing the fiscal year 1962 budget program, I will review briefly our current situation in this operating fiscal year 1961. As many of you will recall from our presentation last year, we were faced with a

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ve a prepared statement."

onnel of the Air Force?"

your Statement."

dollar deficit in fiscal year 1960. Accordingly, we took various actions and actually ended the year within appropriated funds. However, the actions required to stay within the budget caused our strength to drop to about 814,800 on June 30, 1960, more than 10,000 below program, and has brought us to 810,800 on December 31, 1960. We feel that the decline in strength has now been arrested. Programmed personnel actions will raise our strength to 822,900 by June 30, 1961.

The strength shortage at end fiscal year 1960 and continuing through the first half of fiscal year 1961 is entirely in the airman force. Officer strength is proceeding on a programmed decline from 129,700 to 128,700 during fiscal year 1961. The airman understrength resulted from greater losses than predicted.

In order to reduce PCS travel, as directed by the Congress, we have released noncareer airmen returning from overseas or when their unit moved within the ZI, if they did not have 12 months of service retainability at a new station. During the past 18 months this move-reduction and money-saving policy has caused the early release of about 45,000 airmen, some of whom were released as much as a year before their normal date of separation.

To check the strength decline, improve the manning of our units, and reach the programmed objective for end fiscal year 1961, we have taken several actions. These I will discuss later along with problem of airman retention.

FISCAL YEAR 1962 BUDGET PROGRAM

I would now like to cover some of the elements of the fiscal year 1962 budget program beginning with the officer portion. I will discuss this under the headings of "Losses and Gains," "Retention," and "Officer Promotions."

Officer Losses and Gains

The losses forecast for fiscal year 1962 generate our procurement requirements. However, since officer authorizations in fiscal year 1962 are 2,000 below fiscal year 1961, losses will exceed gains by that amount.

Procurement and retention are the key factors in the creation and maintenance of an effective officer force. Procurement obviously must respond to changing requirements. The program for fiscal year 1962 is responsive to our present and future needs in that it reflects an increasing requirement for officers educated in the scientific and engineering fields. Also, our increasingly complex tasks demand that we retain a reasonable number as career officers.

LOSSES. Table 1 shows our forecast officer losses for fiscal year by type and number.

A controlled retirement program, which was explained in detail during last year's hearings, is now in operation. This program was needed because voluntary retirements will not be sufficient in number to provide a balanced officer structure, and to prevent the adverse impact of massive retirement losses in the late 1960s.

During fiscal year 1961, approximately 2,400 officers will be retired under this program and another 2,600 in fiscal year 1962. In addition, about 500 Regular officers have been selected for involuntary retirement under the Officers Career Management Act, which was passed during the last session of Congress. These officers will leave the service during the first half of fiscal year 1962.

The 2,793 obligation and contract termination losses are composed mainly of young officers who voluntarily leave the service after performing the minimum obligated period of service. During last year's hearings, it was pointed out that there was a particular problem in retaining nonrated AFROTC graduates. Retention of these officers is still below the desired level. The Air Force has devoted considerable effort to retaining these officers and will continue to do so.

Table 1—OFFICER LOSSES, FY 1962

TYPE	NUMBER
Retirements, 20 years and over	3,986
Obligation and contract termination	2,793
Career Reserves	350
Attrition (deaths, resignations, passover, etc.)	1,798
Medical officers (professional and others)	2,477
Warrant officers	245
Total	11,649

GAINS. Table 2 shows the sources and numbers of officers to be procured in fiscal year 1962.

The majority of all officers procured in fiscal year 1962 will be college graduates. The service academies provide us with a relatively small group of well motivated Regular officers. The largest single source of college-trained officers is the AFROTC program. The officer training school, a three-month intensive course for college graduates, is producing an increased number of officers during fiscal year 1962 as a supplement to the AFROTC program.

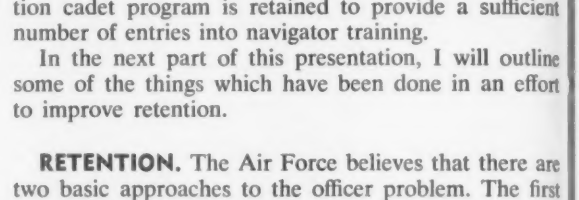
Table 2—OFFICER GAINS, FY 1962

SOURCE	NUMBER
AFROTC	3,657
Officer training school program	1,000
Academies (USAFA, USMA, USNA)	460
Officer candidate school	500
Aviation cadets	604
Airman education and commissioning program	10
Direct appointment and recall	881
Medical officer (professional and others)	2,519
Total	9,649

The officer candidate school and the aviation cadet program are the only sources which are not entirely composed of college graduates. The officer candidate school program serves the purpose of providing a means for capable airmen to achieve officer status. The aviation cadet program is retained to provide a sufficient number of entries into navigator training.

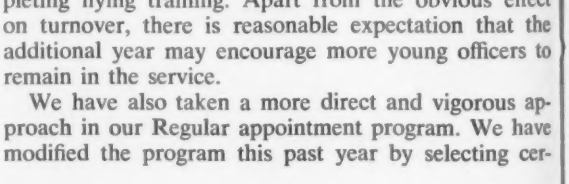
In the next part of this presentation, I will outline some of the things which have been done in an effort to improve retention.

RETENTION. The Air Force believes that there are two basic approaches to the officer problem. The first is to develop procurement programs which produce well educated young officers who are highly motivated from the beginning for full service careers. The second is to convince our better young officers that a service career is challenging and rewarding. I would like to identify two specific steps we have taken to better the retention of young officers.



We have reduced turnover by increasing the required tours of nonrated officers from three to four years. This is more compatible with the required tour for rated officers which is four years from the time of completing flying training. Apart from the obvious effect on turnover, there is reasonable expectation that the additional year may encourage more young officers to remain in the service.

We have also taken a more direct and vigorous approach in our Regular appointment program. We have modified the program this past year by selecting certain active duty Reserve officers for Regular appointment without requiring them to apply. The results have been encouraging. We plan to broaden that program and tender Regular appointments to more young officers. It has been our experience that offering Regular appointments materially affects career intentions.



Next, I want to discuss officer promotions.

OFFICER PROMOTIONS. Since 1954, the Armed Forces have been operating under the Officer Grade Limitation Act which established finite numbers of officers in each service in the grade of major and above, which may not be exceeded. Because the Air Force was a relatively young service at the time of the 1954 act, its proportionate authorization of the total commissioned strength for the field grades was considerably below that of the other services. Upon passage of the act in 1954, the Air Force developed a phased program which would provide continued promotion opportunity. However, field grade strengths reached OGLA limitations in fiscal year 1960.

In fiscal year 1960 the Air Force had to seek legislative relief to afford some opportunity for promotion to the grade of major. Congress granted the needed relief on a temporary basis by permitting an excess to the OGLA limitation in the amount of 3,000 majors until end of fiscal year 1961 pending full examination and possible revision of the grade structure of all the services.

The officer grade structure problem was referred to the Bolte (ODS ad hoc) Committee which was established to study the basic laws, regulations, and practices pertaining to the career management pattern of officer personnel. The findings of this committee promise to form the basis of legislation for a uniform promotion system and grade structure for all the services. This legislation will provide the relief the Air Force needs for the foreseeable future, but will not solve the immediate problem.

In fiscal year 1961 the Air Force selected for promotion to the grade of major approximately 6,000 captains who are now in their 13th and 14th year of active commissioned or promotion list service. Using all existing vacancies, we were only able to promote 2,500. The remaining 3,500 can be promoted during fiscal year 1962 only if the Air Force receives the officer grade limitation relief it is seeking. If, for example, the relief we are seeking is not granted but, rather, the current temporary authority for 3,000 additional majors were to be extended, the Air Force could only promote 2,500 of the 3,500 captains currently on the selected list, in fiscal year 1962. The 1,000 remainder who were selected in fiscal year 1961 could not be promoted until fiscal year 1963. If no relief is granted and the temporary authority expires on June 30, 1961, not only will we be unable to promote those officers already selected, but action will be required to reduce the strength in majors to that authorized by the current OGLA.

Likewise, in fiscal year 1961, the Air Force selected for promotion to the grade of lieutenant colonel approximately 1,900 majors who are in their 19th year of active commissioned or promotion list service. Again, using all existing vacancies, we will be able to promote only 600 of these majors. Of the remaining 1,300, approximately 1,200 will be promoted in fiscal year 1962 while the other 100 will have to wait until fiscal year 1963. No additional selections will be made in fiscal year 1962 unless some new legislative relief is granted. After fiscal year 1962, the same general situation will exist for the grade of colonel.

Accordingly, to prevent complete promotion stagnation, the Air Force has forwarded a separate legislative proposal to the Office of the Secretary of Defense requesting an amendment to the Air Force table contained in the OGLA. The proposal is identical with the grade distribution tables proposed by the Bolte Committee and follows the principles developed by the Congress in the enactment of the OGLA of 1954. The Air Force believes it is fundamental that an officer should have the same basic promotion opportunity regardless of the service he chooses. Equity of promotion opportunity is not possible under the current OGLA.

Consideration was also given to the need for a proper distribution of officers among the various grades that would follow the requirements of the Air Force at the designated levels of responsibility. Under currently programmed strengths, there is an urgent need for officers in the higher grades.

A general revision of the OGLA is vital to the Air Force, both for its on-board officers and those whom it hopes to procure and retain. If some form of relief is not obtained by the Air Force in this session of Congress, active duty (temporary) promotions must be discontinued. This will mean that we will only be able to promote Regular officers at the mandatory permanent promotion service phase points of 14 years to major and 21 years to lieutenant colonel. No Reserve officer can be promoted on active duty above the grade of captain. In addition, as indicated before, some undesirable action will have to be taken to reduce the strength in majors to that authorized under the OGLA of 1954. The Air Force has been seeking grade limitation relief since 1959. It is now one of our most critical personnel problems.

Funds are included in this budget request to support the continuation of the 3,000 temporary major authorizations. However, if legislation is enacted to authorize a general revision of the OGLA, additional funds will be required for its support.

Airman and Cadet Separations and Gains

In our presentation for fiscal year 1961 a great deal of emphasis was placed upon the desirability of stabilizing airman procurement between fiscal years. However, the airman strength deficit at end fiscal year 1960 has necessitated a departure from level procurement programming in fiscal year 1961 and fiscal year 1962.

The undesirable impact on our training and recruiting facilities caused by fluctuations in procurements are recognized and every effort will be made to return to a reasonably level procurement program as soon as practicable.

Table 4 which follows is a reflection of our airman and cadet separations.

creased separations for the purpose of immediate reenlistment. Although reenlistment separations do not represent actual losses from the active duty force, they do have a significant impact on the military personnel budget, i.e., reenlistment bonus, separation, and travel costs.

Total separation losses are estimated to decrease in fiscal year 1961 and fiscal year 1962. In fiscal year 1962 nonreenlistment losses are programmed to drop to a level below either of the preceding two years. The decline in this loss category in fiscal year 1962 is not due to improved retention, but reflects the effect of low procurement in fiscal year 1958. Early release and attri-

Table 4—AIRMAN AND CADET SEPARATIONS

	FY '60	FY '61	FY '62
Separations to reenlist	41,596	82,100	92,800
Separation Losses:			
Nonreenlistment on ETS	40,592	45,077	33,100
Early release	33,004	29,623	25,400
Retirements 20 years and over	3,796	6,800	10,000
Attrition	41,620	33,585	32,182
Internal status changes[1]	3,307	3,803	2,600
Total separation losses	122,292	118,888	103,282
Total separations	163,888	200,988	196,082

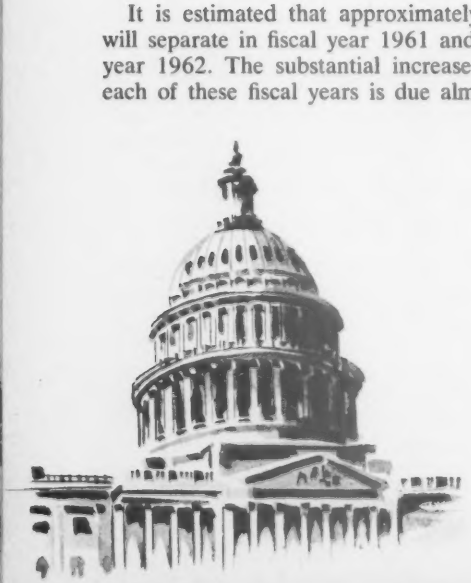
[1]Includes airmen to officer and aviation cadet status, cadets to officer status.

Table 5—AIRMEN AND CADET GAINS

	FY '60	FY '61	FY '62
Reenlistment gains	41,596	82,100	92,800
Enlistment nonprior service males	83,059	110,600	90,000
Other gains from civil life[1]	9,044	13,697	13,732
Internal status changes[2]	6,419	3,728	1,550
Total procurement gains	98,522	128,025	105,282
Total gains	140,118	210,125	198,082

[1]Includes prior service, WAF, aviation cadet, OTS enlistments, Reserve recall and Air Force Academy procurement.
[2]Includes aviation cadet washouts, "returned from dropped=from rolls" and others.

It is estimated that approximately 201,000 airmen will separate in fiscal year 1961 and 196,000 in fiscal year 1962. The substantial increase in separations in each of these fiscal years is due almost entirely to in-



tional losses are programmed to decrease for substantially the same reasons.

Losses through retirement are estimated to increase to approximately 10,000 in fiscal year 1962. This, of course, is due to the normal maturing of the force.

Table 5 is a reflection of the airman and cadet gains needed to replace our losses and attain programmed strength objectives.

Procurement estimates increase from 98,522 in fiscal year 1960 to 128,025 in fiscal year 1961 and then decline to 105,282 in fiscal year 1962. Approximately 9,000 of the total procurement required in fiscal year 1961 is to offset the airman strength shortage at the end of fiscal year 1960. As I pointed out in my earlier comments, we plan a reduction of 2,000 officers. These losses are offset by a corresponding gain in airman strength and account for the 2,000 airman gains over losses indicated for fiscal year 1962.

AIRMAN PROMOTIONS. Promotion opportunity is the largest single incentive we have in the Active Force. The primary reason for nonreenlistment is the lack of promotion opportunity. The impact of promotion stagnation in fiscal year 1959 and fiscal year 1960 on reenlistment of first-term airmen is shown in the retention statistics which will be discussed later.

Table 6 summarizes the number of airman promotions to the top six enlisted grades in fiscal years 1957 through 1962.

The Department of Defense limitation of 58.5 percent on the top six enlisted grades remains the same for fiscal year 1962. The total number of promotions programmed for the top six enlisted grades in fiscal year 1962 is greater than it has been for any year since 1957. The number of promotions programmed to grade E-4, however, is less than the number required to improve retention. It is important to point out that the Air Force has approximately 35,000 airmen in grade E-3 with over four years of service. Since a number of the promotions to grade E-4 must of necessity go to this group of airmen, it automatically reduces the total number of promotions otherwise available to the potential first-term reenlistee.

Table 6—AIRMAN PROMOTIONS, FY 1957 through FY 1962

de	FY '57	FY '58	FY '59	FY '60	FY '61	FY '62
				1,620	2,010	1,900
			4,938	4,132	4,511	4,250
	3,108	1,988	1,070	1,912	3,663	5,120
	7,092	4,934	2,430	3,184	5,150	7,300
	38,653	26,445	10,844	10,693	11,721	16,200
	91,877	31,639	25,948	40,690	52,753	49,238
al	140,730	65,006	45,230	62,321	79,808	84,008

Promotions to the two top grades of E-8 and E-9 will be made in accordance with the phased buildup planned for these grades. In fiscal year 1962 the USAF will be in the fourth year of its five-year program. The legal limit established for this program is one percent of the airman strength in grade E-9 and two percent of the airman strength in grade E-8. At the end of fiscal year 1962, there will be 16,036 airmen assigned to these grades; 11,014 E-8s (1.59 percent) and 5,022 E-9s (0.72 percent).

AIRMAN RETENTION. Paradoxically, in an atmosphere of unsatisfactory retention of first-term airmen, the total number of reenlistments is programmed to increase during fiscal year 1961 and fiscal year 1962. These increases are due primarily to the larger number of career airmen who will complete their enlistment contracts and reenlist during these two years. While the overall reenlistment rate for career personnel remains constant at about 90 percent, the retention of career personnel in some critical technical areas continues to remain at an unsatisfactory level. It is for these technicians that an expansion of proficiency pay numbers and pay rates is needed.

In any analysis of airman retention and the Air Force's capability to retain its personnel, it is essential that we emphasize the retention of first-term airmen. It is this individual toward whom the majority of our retention effort must be directed.

Retention of first-term personnel declined sharply in fiscal year 1960. This decline in first-term retention resulted primarily from the following:

1. Lack of promotion opportunity in fiscal year 1959 and fiscal year 1960.

2. Because of an inability to attain a higher grade during the first enlistment, lower bonus payments were received by first-term reenlistees. For example: A first-termer prior to fiscal year 1960 reenlisted in the grade of E-4 and received approximately $640 in reenlistment bonus for a four-year contract, whereas, the average reenlistee today is reenlisting in the grade of E-3 and receives a bonus of approximately $496. It is

unfortunate that the primary incentives of promotion opportunity and reenlistment bonus are so interdependent that a reduction in promotions automatically produces a corresponding reduction in bonus payments.

Retention estimates for fiscal year 1961 and fiscal year 1962 are considerably below the desired levels. Reenlistment objectives must be based upon a known requirement for specified skills and a given level of experience. For example, not every Air Force job requires the greater knowledge and skill one expects to find in the career airman. The cost of longevity, dependents, and retirement benefits which accrue to the career force member raises the price paid for these jobs to a prohibitive level. There are many such positions that can be effectively and more economically manned with first-term personnel.

The optimum airman force program which was implemented in fiscal year 1961 permits us to determine the numbers and types of first-term airmen whom we must reenlist to sustain a balanced force. Table 7 indicates our first-term reenlistment objectives and how we have approached that objective in fiscal year 1961. It also contains estimates of our capability in fiscal year 1962.

In accordance with the provisions of the selective retention program, airmen are selected for reenlistment from 9 to 14 months prior to their scheduled date of separation. Selections are made by board action and are held within established reenlistment objectives.

In fiscal year 1961, 21,183 first-term airmen either reenlisted or extended against an objective of 27,409. This is an achievement of 77.3 percent. In quota achievement anything less than 100 percent of the objective is unacceptable.

Our inability to achieve objectives in fiscal year 1961 was twofold: in the technical skills our inability was due solely to a lack of retention capability; in the nontechnical skills, on the other hand, we were faced with a shortage of eligibles for reenlistment.

By way of explanation, the shortage of eligibles in the nontechnical skills was due to the small number of personnel enlisted into these skills during fiscal year 1957, thus leaving us with an inadequate reenlistment pool upon which to draw.

Estimates for fiscal year 1962 show continued inability to achieve our objectives. Reasons for the short fall are substantially the same as they were in fiscal year 1961; however, they are compounded by the fact that the limited procurement of highly technical personnel in fiscal year 1958 now becomes an additional deterrent to our reenlistment of this category of people.

It is apparent that retention is not satisfactory and that additional incentives must be designed if we are to meet our retention goals.

Proficiency pay was implemented in fiscal year 1959. It was initially implemented as a five-year program with progressive increments planned for each of the five

Table 7—SELECTIVE RETENTION PROGRAM FOR FIRST-TERM AIRMEN

	FY '61			FY '62		
	Reenlistment objectives	Total reenlistments and extensions	%	Reenlistment objectives	Estimated reenlistments and extensions	%
Occupational skill areas:						
Electronics	6,265	5,372	85.7	4,207	2,763	65.7
Mechanics and repairmen	7,832	6,637	84.7	5,238	2,904	55.4
Other technical	2,342	1,252	53.5	1,469	975	66.4
Administrative and clerical	5,665	4,395	77.6	3,776	2,506	66.4
Crafts	2,191	1,546	70.6	1,478	1,380	93.4
Services	3,016	1,895	62.8	2,046	1,563	76.4
Miscellaneous	98	86	87.8	56	49	87.5
Total	27,409	21,183	77.3	18,270	12,140	66.4

ars. Its purpose was to provide an incentive specifically directed toward the retention of highly technical ersonnel. At the end of fiscal year 1960 approximately ,000 airmen were receiving this additional pay at the -1 level of $30 per month. Beginning with fiscal year 961, the payment of airmen at the P-2 level was pproved and implemented at $60 per month. The cal year 1961 program provides for approximately 500 airmen at the P-2 level and 67,500 P-1s. The mbers of personnel programmed to receive proficiency pay during fiscal year 1962 are the same as ose programmed for fiscal year 1961.

Recent statistics indicate that proficiency pay has

creased our capability to retain personnel in critical ills. In some instances retention has improved as uch as six percent in a proficiency pay skill. It is nificant to note that this improvement was made en though there was a decline in other incentives such promotion and bonuses.

Within the limits of our authority the Air Force oficiency pay program is being modified to include yment of proficiency pay to first-term airmen in ades E-3 and E-4 who have either reenlisted or tended their enlistments.

As a further effort at improving retention, a base preference policy is being inaugurated on July 1 of is year. Under the provisions of this policy, a first-rm reenlistee will be given an assignment to the base his choice provided, of course, that he has served 18 nths at his present station and a requirement for an dividual of his qualifications exists at the selected se.

In summary, the most significant problem in the rman area remains the retention of first-term personel. In an effort to resolve this problem we are working th the Department of Defense on a series of proposed tions, some of which will require legislative approval.

We will hear your Statement

SENATOR GERALD R. FORD, JR., *Michigan*: . . . What is the situation on your E-8 and E-9 program?

E-8 and E-9 Program

GENERAL LIGON — Our E-8 and E-9 program is progressing in accordance with the schedule established on our initial buildup.

In fiscal year 1962, we show the Air Force will be in its fourth year of a five-year program. The law limits the airmen in these top grades, 1 percent of the total strength in grade E-9, and 2 percent of the airmen strength in grade E-8. At the end of fiscal year 1962 we will have reached a point wherein the E-8 level, the senior master sergeant, will be at 1.59 percent of our force, and in the E-9, the chief master sergeant, at 0.72 percent, so you can see we are moving toward our 1 and 2 percent.

This is a very effective program.

MR. FORD — How much do these programs cost you a year in dollars?

GENERAL LIGON — We do not have a breakout of that specific. We will furnish it for you.

(*The information to be supplied follows*:)

COST OF E8 AND E9 PROGRAM

FISCAL YEAR	E8	E9	TOTAL
1960	$1,866,694	$ 498,865	$2,365,559
1961	3,075,233	2,688,707	5,764,000
1962	3,648,438	4,389,495	8,037,933

Proficiency Pay

MR. FORD Do you give proficiency pay to any of your E-8 and E-9 people?

GENERAL LIGON Yes, they are eligible for proficiency pay.

MR. FORD Give us an appraisal of your proficiency pay period at the present time.

GENERAL LIGON The Air Force proficiency pay program is moving forward and is beginning to show results which we think are very encouraging. They are beginning to do what we estimated they would do, but they have fallen far short of what we think we need to do in the proficiency pay program.

In my statement, in discussing the proficiency pay program on pages 23 and 24, I point out our fiscal 1961 program will provide for 7,500 airmen at the P-2 level at $60 a month, and 67,500 P-1's at $30 per month.

The number of personnel programmed for fiscal year 1962, however, will remain at this same level. In other words, we will not get any increase in numbers of people.

MR. FORD How much is this program costing you in fiscal year 1961 and how much will it cost in fiscal year 1962?

GENERAL FRIEDMAN $23.7 million in 1961, and $29.8 million in 1962.

MR. FORD Is the increase in 1962 because more people are getting in the P-2 program rather than the P-1?

GENERAL FRIEDMAN No, sir. It is a matter of man-years. The numbers of participants, P-1 and P-2, are the same, but there is a larger number of man-years in 1962 than in 1961.

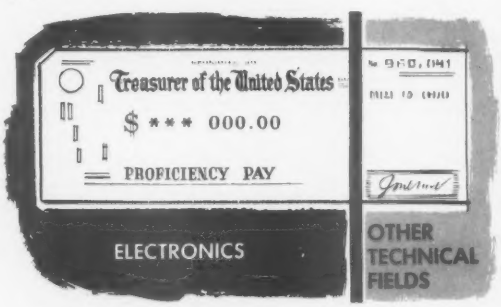
MR. FORD Does the Air Force follow the policy of giving proficiency pay to the job, or does the proficiency pay go with the man regardless of the job that he occupies?

Proficiency Pay Only To Critical Skills

GEN LIGO In the implementation of the proficiency pay in the Air Force, we are using proficiency pay as indicated in the basic law for the purpose of retention in the service of trained enlisted personnel in occupations of critical importance to the service. So our entire proficiency pay program to date, and we hope to continue it, is given the allocation of spaces, to the people in the hard-to-train, hard-to-retain area. If he stays in proficiency type work, he will continue to draw it. If he goes out of it, he falls out of the program.

MR. If a man is in an electronics assignment where he warrants, because of the job and his ability, proficiency pay, what happens when he goes to recruiting duty?

GEN LIGO He falls out of proficiency pay at that time. In accordance with the DOD directive which controls this, we find it provides for a man moving out for 90 days to TDY, or going from this type of assignment without losing his proficiency pay. It also provides if he moves from a proficiency pay scale where we have an excess, or where we want to move him to another proficiency skill, it gives him 12 months to retrain in the proficiency pay skill. He is still in a proficiency pay skill and will not lose the proficiency pay.



It takes the man's know-how. We are buying his knowledge and ability and retraining him to move into another critical short area. In fiscal year 1961 and fiscal year 1962 we are putting 70 percent of our proficiency pay in electronics areas, and the other 30 percent in other technical fields.

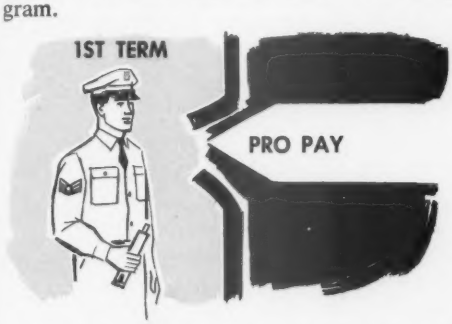
We are not employing all of the provisions available in Department of Defense proficiency pay instructions, that 15 percent of our proficiency pay could be put in any skill, regardless of its criticality, for outstanding performance. We do not intend to go to this program until we determine it is necessary.

MR. What numbers, if any, are in your first-termers getting proficiency pay?

Proficiency Pay To First-Term Enlisted Men

GEN ERAL LIGO N

The Air Force regulations, up until about a month from now, or two months from now, has restricted proficiency pay to a man on his second enlistment, so he has to be past a first-termer. We believe if we can get our program increased in accordance with original requests to go to 80,000 at end of fiscal year 1962 rather than leveling off at 75,000, we can take these first-termers who have attained a critical skill. They are at the E-3 or E-4 grade and indicated their intention to reenlist, or actually taken an extension so they would reenlist, and give them proficiency pay in their first term. This will be their first move toward giving proficiency pay to a first-termer. We think this will assist us in our program.



MR.

GEN LIGO

FORD Did I understand you to say you had some excesses in critical skills?

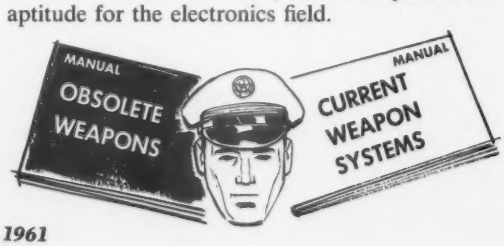
ERAL ON Some developed by reason of change of equipment. You might have a specific type of skill working on a particular piece of equipment which goes out of the inventory. You may need this individual in a related skill. You have to cross-train him into this.

Retraining Due To Mission Changes

FORD Was it two years ago the Air Force told us about a program of taking people who were in one area and, because of a change of mission, or change of weapon system, and because their skill was no longer needed, you were going to retrain them?

ERAL ON We are doing this continually. It is essential that we do this in our enlistment program and selective reenlistment.

He may be in a skill today which does not fit into an electronics field, but he may have an aptitude for the electronics field.



MR.

How many are involved in that kind of program? MR. FORD

I will have to give you a number. About 100 per month for retraining. GENERAL LIGON

These are career people? MR. FORD

Yes, sir. GENERAL LIGON

I would like to point out the other restriction on proficiency pay, the amounts by law we are authorized to pay at the rate of $50, $100 and $150, for the P-1, 2, and 3 levels. We have no P-3s in the program yet.

The restrictions today are $30 at P-1 and $60 at P-2 as compared to $50 and $100 authorized by law. We are of the opinion we will not really obtain our objective through proficiency pay at $30. It is not sufficient to attract the man to stay with us. So we have requested, and are working with DOD, asking the P-1 rate be raised to its maximum of $50, and we think we should move the P-2 rate up to its maximum as rapidly as we can. It will cost more money, but we think if you are talking about retention of critical skills, which is the purpose of the law, we should give it a chance at the legal limit which we have.

Let's take a man in one of your critical skills who is an E-9 and getting P-2 pay and all the other things that are involved in compensation, and put his situation in the record so we can get a picture of what a man in that category is earning on a yearly basis. MR. FORD

We will furnish that. GENERAL LIGON
(*The information to be supplied follows*:)

Typical pay for chief master sergeant (E-9), annual basis

Base pay	**$5,088**
Quarters allowance	**1,163**
Subsistence allowance	**402**
Proficiency pay (P-2)	**720**
Clothing maintenance allowance	**72**
Subtotal	**$7,445**
Social security (this is a cost item to the "Military personnel" appropriation, but is not paid to the individual)	**144**
Total annual compensation	**$7,589**

Zora

What does an Air Force family see when they are assigned to a strange country with unfamiliar culture and customs? For some, unfortunately, the vision is restricted, short-sighted, and narrow. Others, equipped with broader horizons, can find warmth and beauty in any surroundings. It is all a matter of perspective.

by A2C PAUL A. SEARS
Orlando Air Force Base, Fla.

WHEN MY WIFE AND I first saw Zora, she was standing meekly at our back door awaiting our decision. This little Arab woman was seeking domestic employment in our home in Morocco. Silently she offered us her neatly folded stack of references—a gratuitous gesture, because Zora had been highly recommended by a friend, and we had already decided to hire her. Although we knew she had learned some English from a former employer, we were amazed that she spoke our language so fluently. In a soft, musical accent she proceeded without difficulty to arrange a suitable salary and satisfactory working hours.

Like all Arabic women, Zora was required by Moslem law to wear a hooded, ankle-length robe and to keep her face covered with a veil; only her eyes, hands, and feet were revealed in public. However, while they worked in our little American community, the *Fatimas* (as Arab women are called) gladly shed their robes and carried out their duties in costumes which combined native and Western styles. Zora usually wore second-hand cotton dresses which were given to her by former employers; occasionally she even donned a blouse and dungarees.

She had a slim, tiny body and seemed younger than her thirty years. Her face bore the beauty marks typical of Arab women: an intricate design tattooed between her eyebrows, and another on the center of her chin. She kept her long black hair tied back with a sheer scarf similar to the one worn to veil her face in public. Because she had dark eyes and smooth, olive-colored skin, she did not need cosmetics to mellow her pleasant

features. To our surprise, her hands, which showed the effects of hard work, were orange in color. She explained that many Arab women henna their hands and feet to enhance their beauty. Perhaps indirectly as an attempt to please us, and in trying to be more like the American women she admired, Zora discontinued this beauty practice, and the henna color soon disappeared.

Even though we tried to win Zora's confidence with good-natured informality, progress was very slow at first. She seemed constantly tense, as if she were afraid she might unwittingly annoy us in some way. One morning while washing dishes, she cracked the lid of our coffee pot. This mishap upset her so much that she could not restrain her tears. After several minutes of reassurance, we were able to convince her of the unimportance of the accident. She reassumed her composure and silently returned to her tasks. Before going home that evening she timidly expressed her gratitude for our understanding; the following morning she accepted for the first time our repeated invitation to join us for some coffee and toast before starting to work.

Our consistent sincerity and patience had finally started to erase Zora's fears, and a genuinely devoted friendship began to form. As her feelings of uneasiness gradually subsided, we learned many interesting facts about Zora in our casual conversations. She told us that her husband, whose name was Ahmed, had been struck down by an automobile and left for dead beside the road. In addition to other injuries, both his legs were broken in the accident. Although he had been recuperating for over a year at the time we hired Zora, he still could not walk well enough to resume his occupation as a waiter in a Casablanca restaurant.

Zora had four daughters, who ranged from two to eight years of age. Fatna, Amina, and Malouda attended school each day while Maria, the youngest, was cared for by Zora's grandmother. The entire family lived in a three-room apartment with no electricity or plumbing; the only heat was supplied by a charcoal burner. Even though her family was dependent on her for subsistence, Zora never complained or thought of herself first. On one occasion she forfeited a badly needed winter robe and a visit to her dentist so that she could give her children the traditional lamb feast which concluded one Mohammedan holiday.

We gave Zora many household items, including a kerosene heater, some cupboards, and an old electric refrigerator with the globe-shaped motor on top (nearly a year passed before electricity was installed in her home and the refrigerator could be used). Even these simple things were luxuries she and her family had never possessed.

We decided that Christmas would be a very appropriate time to fulfill many of the needs of this devoted little Arab woman, as well as an opportunity to share the pleasures of a joyous season with her family, who had never had a Christmas. Well in advance of the holiday, we began purchasing clothing, toys, games, and various gifts. By Christmas Eve we had over 90 gaily wrapped presents under our colorful tree. When Zora arrived with her family and saw the surprise we had prepared, her eyes glistened in silent appreciation. Although Zora's family could not speak English and our Arabic was equally limited, the language barrier was no problem; her children were enchanted, and their happy exclamations were in the universal language of "Joy." That was the best Christmas we had ever known because our hearts were filled with the humble rediscovery of the true meaning of the holiday.

Zora had no formal education, and she could not read or write. When she told us how embarrassed she was to mark an "X" for her signature on her identification card, we immediately taught her how to print her name; she was very proud of that accomplishment.

When she first started to work for us, she had some difficulty in pronouncing our names. We explained that it was "just like 'Sears and Roebuck'," an example which she readily understood because she had often admired the innumerable articles shown in their catalog. However, due to our careless pronunciation, she then referred to us as Mr. and Mrs. "Searsan." In spite of our misleading example, she finally was able to accomplish the correct pronunciation.

Even though she was uneducated, Zora certainly was not an ignorant person. Whenever she happened to be alone at lunch time, she could distinguish the various kinds of soup by noting and remembering the different markings on the labels (which showed no picture of the can's contents). When she was given groceries that required special cooking instructions, such as packaged pudding mixes, she memorized the correct procedure so that she could prepare them later in her home.

Zora spoke several languages with proficiency: Arabic, French, Spanish, Portuguese, and English. After her parents had died from tuberculosis, she was raised by a French woman who had wisely insisted that Zora use proper grammar in each language she learned.

Because she had spent her childhood in a Catholic environment, Zora had many religious convictions which disagreed with the Moslem teachings of her people. Being a woman, she was not allowed to express or even to have opinions, but she quietly practiced as liberal a form of Mohammedanism as she dared. However, she was not aimlessly revolting against her faith; rather, she sincerely wanted her daughters to have more freedom of action and a better education than Arabic females had known previously. Zora's husband was in complete agreement with her wishes for their daughters' future.

Zora had no material wealth, yet she shared her treasure of love and kindness with all her friends. She had none of the greed and dishonesty which often accompany poverty; instead, she could always find time to help others, to work hard, and to have fun. Zora's future held no real encouragement or promise of improvement over the past, but she had set a meritorious goal—to provide her children with every opportunity for worthy progress—and we truly hope that such a generous and unpretentious objective will be granted success.

The X Marks the Way

Experimental aircraft and the men who flew them have blazed a tra edge designs and other men with still-to-be-proven capabilities will lead the ontrol

Just about every time the X-15 flies it sets a new record. To the casual observer, establishing records may seem to be its only reason for being. Nothing could be further from the truth. Records are merely the by-product of engineering and technological achievement.

The X stands for experimental, the 15 the number in a long line of research aircraft. This manned missile is streaking to unprecedented altitudes and speeds, catapulted by the experience, knowledge, and technology of its predecessors; it is researching and enlarging the flight envelope now opening into maneuverable manned space flight.

World War II jet aircraft and rocket-powered missiles promised near-sonic speeds for man as early as 1944. Diving fighter pilots had felt the buffeting of the shock wave of compressed air that built up ahead of a wing's leading edge. This shock wave was the sound barrier.

Not even the engineers knew what would happen to an airplane and the man inside it when they were forced deeper into or through this mass of compressed air. Wind tunnel tests had been inconclusive because the winds "choked" up. When air moving at the speed of sound struck the nose of an aerodynamic shape in the tunnel it was compressed into a shock wave that bounced off the wall of the tunnel, disrupting the airflow.

Air behaves much like water. Neither offers much resistance to slow gentle movement, but try running through waist-deep water. Aircraft encounter a similar situation at Mach 1, the speed of sound.

The Bell X-1 was the first aircraft designed and built for pure research. Like all X-type planes it went looking for trouble—and information that wind tunnels couldn't provide. Design began with a bit of off-the-shelf aerodynamic knowledge. The .50-caliber bullet had pierced the sound barrier so that was the aerodynamic shape of the shortwinged X-1. The horizontal stabilizer was moved up the tail fin to avoid the turbulent flow of high-speed air over the wings. The X-1 was built to withstand far more G forces than man would be expected to take. Although pilot safety was carefully considered, there was no escape system. Ejection at X-1 speeds was considered far too dangerous.

It was powered by a Reaction Motors, Inc., XLR-11 engine (XLR for experimental liquid rocket) which would deliver 6,000 pounds of thrust for two and a half minutes. That meant flight must begin with an airdrop. The first X-1 was ready for testing just before Christmas 1945.

The normally cement-hard, miles long, dry lakebeds at Edwards AFB, ideally suited for landing aircraft without power, was out of commission for rains so the first flight was made at Pinecastle AFB, Fla. Jack Woolams, a Bell test pilot, checked its glide and landing characteristics without power. Woolams was killed in another aircraft accident before engines were installed so Chalmers "Slick" Goodlin, another Bell pilot, finished checking out the X-1 for design specifications. Goodlin had trouble holding speed down to Mach .8 on the remaining contractor flights.

The Air Force and 24-year-old Capt. Charles "Chuck" Yeager took over the testing of X-1 in the summer of 1947. In traditional fighter-pilot fashion Yeager christened the bird "Glamorous Glennis" after his wife, climbed in and began expanding the flight envelope slowly, one careful step after another.

Chuck Yeager is a graduate of the seat-of-the-pants flying brotherhood, but the test pilots who know him say that he is also an intuitive engineer. He made and reported careful, comprehensive observations of the X-1's behavior across every inch of sky, past every graduation of the Machmeter, and at every foot of altitude.

At 40,000 feet X-1 pilot climbed down ladder into cockpit d soun

edge of space. Other advanced
ontrolled, manned space flight.

by CMSgt. EDISON T. BLAIR, Airman Staff

Then on October 14, 1947, he fired all four rockets after the drop; blasted "Glamorous Glennis" to a safer altitude; and pushed over slowly into level flight. Uneventfully, man and airplane shoved through the sound barrier and beyond. Total flight time that day was 14 minutes. After this, flight faster than sound became routine. Less than a month later Yeager flew the X-1 at Mach 1.35—910 m.p.h.—at 48,000 feet.

The initial success of the straight-winged X-1 prompted orders to Bell for larger, faster, more powerful versions. The D model blew on an early attempt at powered flight nearly killing Maj. Frank K. "Pete" Everest who took over the experimental tests from Yeager. The C model was never completed but it was cannibalized to modify and repair other models. The X-1B set no sensational records but helped to gather much valuable information. Last of the series to be delivered was the record-breaking, data-gathering X-1A. Into it was incorporated all the knowledge gained in the X-1 tests.

All these aircraft were used jointly by the Air Force, the National Advisory Committee for Aeronautics (now National Aeronautics and Space Administration), and the Navy. This joint group also used other X-type aircraft to explore the regimes of flight during the late 40s and into the 50s. Most proved their important points early, though in less spectacular fashions.

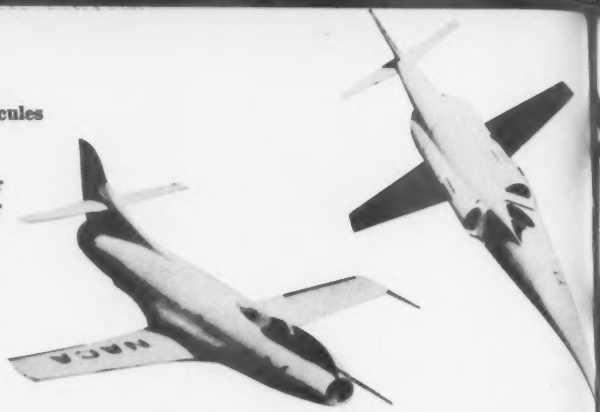
Ten months after Yeager broke the sound barrier, Major Everest poured the watered alcohol and liquid oxygen into the X-1's burners and rocketed over Edwards AFB to 73,000 feet and an altitude record that lasted two years. In August 1951 Bill Bridgeman, a Douglas test pilot, cracked 79,000 feet and Mach 1.89 in the D-558-II Douglas-built *Skyrocket*. This experimental rocket plane was built for the Navy and was also used by NACA.

Then two years later Col. Marion Carl, USMC, piloted the *Skyrocket* to more than 83,000 feet. Later that year, 1953, Scott Crossfield, then a NACA pilot, took the D-558-II to Mach 2.0 and became the first man to fly twice the speed of sound. Crossfield is now a test pilot for North American Aviation and checked the X-15 out for them before turning it over to the Air Force and NASA.

2,905 miles per hour scorched the nose of the X-15.

d sound barrier. X-2 was easier to get into, harder to control.

Scattered air molecules herded ahead of airplane wings formed the barrier that Chuck Yeager smashed forever.



The Air Force accepted the X-1A at Edwards AFB in mid-1953. Chuck Yeager returned to Edwards to check it out. It had been six years since he first broke the sound barrier in the earlier X-1. The stability of the X-1A at high speeds was doubtful and it took several months to de-bug it. Chuck Yeager had earned a chestful of ribbons by the time he was 22, but he was still a cautious man.

So it was with caution the 30-year-old major approached the X-1A the morning of December 12, 1953. His job that morning was to check the aircraft's ability to take the stress of full acceleration.

Besides the airplane, Yeager was also checking the old type T-1 partial pressure suit and trying out a new plastic helmet. Lt. Col. Jack Ridley and Maj. Arthur "Kit" Murray were flying chase.

Yeager radioed his check list item by item and a Bell engineer with a duplicate instrument panel on the ground double-checked the pilot's actions. Like the X-1, the A model was without an escape mechanism. The canopy was clamped on before flight and was opened from the outside after landing. Flight controls were operated by compressed nitrogen because electrically boosted controls would make the pilot lose the "feel" of the control action at critical speeds.

By present-day X-15 standards, the X-1A instrumentation was primitive. But movie cameras in the B-50 drop plane recorded the smooth drop. Other sequence cameras looked over Major Yeager's shoulder and recorded instrument readings throughout a flight that was to be the most perilous Yeager had ever made. They told parts of the story that Yeager was unable to remember.

The rockets were fired and the X-1A accelerated in a gentle climb. At 45,000 feet Yeager nosed over into level flight for Mach 1 penetration and went supersonic. He pulled her up then, four and a half minutes after drop, lighted off the last rocket, and quickly left the chase planes far behind. Then all radio contact was lost.

The story pieced together later showed that the X-1A was doing Mach 1.5 at 65,000 feet. He started to level out. Speed built up fast and by the time Yeager finished the push-over maneuver well beyond 70,000 feet, the X-1A was indicating Mach 2.5—1,650 m.p.h—a new world's record. But the X-1A had also gone beyond her stability limits. The nose yawed, then pitched, and the dread inertial coupling experienced by most rocket test pilots gripped the research aircraft. Completely out of control, the X-1A skidded wildly and cartwheeled end over end across the sky.

Yeager was slammed around the cockpit with the force of 14 Gs as he "experienced all the laws of motion through space." Man and plane tumbled violently nearly 10 miles down toward the earth. Semiconscious, Yeager fought to regain control.

Near 25,000 feet the dense air slowed the plane's gyrations to a familiar spin, and the shaken and bruised major gradually regained command through reflex rather than conscious thought. Gasping for the air squeezed from his lungs by the pressure suit, and from the pain of his injuries, he managed to key the microphone for a report:

" . . . down to 25,000 . . . . don't know if I can get back to base or not . . . . got to save myself for landing . . . . don't know if I tore anything up or not . . . . had to cut short the test . . . . I got into real bad

Array of X-type aircraft. From left: X-1A; X-3; D-558; XF-92; X-5; and X-4.

trouble up there."

Murray found him just in time to give last-second landing guidance. As he touched down, Yeager radioed the ground crews to hurry and "get this thing (pressure suit) off. I'm hurting."

"You know," Yeager drawled in his West Virginia accent as they lifted the canopy, "if I'd had a (ejection) seat you wouldn't see me in this thing."

The heavy strong plastic canopy they lifted off Yeager had a long crack in it where his helmeted head had banged against it. The helmet passed the test. The cameras showed that every instrument in the cockpit had been pulled clear off scale by the wild gyrations and G forces. The record Yeager had set was all but ignored at the debriefing. He was more interested in telling what he had learned about the stresses and other things vital to building better, faster, and more manageable airplanes. And in warning those who would follow him on what to expect.

Murray and Yeager traded cockpits. Murray took the X-1A and Yeager flew chase. For six months Kit Murray studied the eccentricities of the X-1A, hangar flew with Yeager every remembered second of Yeager's flight, and otherwise readied himself for a check of the tiny plane's altitude capabilities.

"If you go into instability the maneuverability of the airplane increases a thousand percent," Yeager told him. "You get extreme reaction to control movement. It might be 550 degrees a second—two complete rolls."

That's where the dread inertial coupling begins. The plane yaws a little and some of the inertia—kinetic energy of motion—of forward speed is transferred to the yaw motion. It's the same thing that makes your car skid around a curve. Then as the plane's nose pitches, it too gains inertial energy. The extra energy now increases the swing of both yaw and pitch, until the motion is coupled around the roll axis of the plane and all hope of control is gone. The airplane tumbles end over end.

Trouble started on Murray's first flight in the beast. He had turbo-pump trouble, engine malfunction, lost nitrogen source pressure, had a gear that wouldn't lock, and a frosted-over windshield. By June 1954, Murray was well versed in Murphy's Law—anything that could go wrong would.

On June 4, everything worked. He followed the same flight profile Yeager had flown except he kept going up past 70,000 feet. Coasting up after burnout, he had time to notice bits of cloud over the Pacific 100 miles away, to see the gentle curve of the earth, the brown desert below him, and to exult in the vastness. At the same time he was filled with a great sense of humility and gratitude toward the hundreds of people on the ground supporting this flight.

Murray had no horizon reference above 90,000 feet when he nosed the plane over. There was only the curve—and instruments. But the instruments weren't much help. They lagged. They told him only what had happened to the plane a few miles back. He needed to know that was happening now, at the instant he looked at the instruments. Today this problem is solved through electronically controlled and computer-fed instruments.

The X-1A had clocked just a little shy of Mach 2 before the rockets burned out at 85,000 feet, so Kit was flying much slower than Yeager had been when he started down. Nevertheless, Murray also lost control to inertial coupling and tumbled nearly eight miles down. The slower start, his own experience, and what Yeager had told him helped him hang on until he felt control returning as he dropped through 70,000 feet. Chuck Yeager waited below to talk him down.

Murray went on after this to check out the Bell X-5, which had swept-back wings that could vary their sweep during flight. It furnished much information on the advantages and disadvantages of swept wings. And it provided more needed experience for Kit Murray to take with him when he became Air Force project officer on the X-15. Murray is now retired.

Meanwhile the swept-wing X-2, which had been ten years in building, was ready for testing. The first X-2 had blown up during a contractor test and killed Skip Zeigler, the Bell test pilot and Frank Wolko, an assistant. In August, 1954 Maj. Frank Everest and the X-2 were launched above Edwards AFB for an unpowered glide test. When the gear failed after touchdown, the plane skidded all over the dry lake bed with Everest. The X-2 was repaired, but before the gear was finally fixed with whisker-like skids far out on the 32-foot wings, it washed out twice more as Everest landed the tricky plane.

Reactions are predicted in experimental flights but knowledge only

The X-2 was bigger than the second generation of the X-1s and had to be carried aloft in the bomb bay of a modified B-50. It was powered by a throttleable Curtis-Wright XLR-25-3 engine that developed 15,000 pounds of thrust.

The control problems encountered in the X-1 and X-1A had pointed up the need for an escape system for pilot safety. Early sled tests made by Lt. Col. Paul Stapp at Holloman AFB, N. Mex., proved high-speed escape was feasible. Colonel Stapp was even now trying to establish limiting speeds for safe ejection. So the entire cockpit and nose of the X-2 was an escape capsule fastened to the fuselage with explosive bolts.

Finally in May 1956, Frank Everest hurled the X-2 across the sky at Mach 2.5 without letting her out. But it was obvious that she needed some modification and an engine that would burn longer. Everest broke his own record two months later and chalked up 1,900 m.p.h. although he, too, ran into the seemingly inevitable control problem. Everest, however, had finished his tour. Before he left Edwards he trained a young jet ace who was also an engineer, Capt. Iven Kinchloe, to wring out the X-2.

So in September 1956, Kinchloe took the X-2 up to 126,000 feet and a new altitude record. That was nearly eight miles higher than Murray had flown the X-1A. Murray, Everest, and Kinchloe ushered a new type of test pilot into the Air Force—the trained engineer who fully understood the objectives of the tests. Captain Kinchloe's back-up and number two pilot for the X-2 was another youthful engineer, Lt. Milburn "Mel" Apt.

Mel Apt, project officer testing the F-105, was not only an engineer, but a top-flight engineer. Although he had never flown the X-2, he had flown chase for Everest and Murray. He had watched how they handled the plane, had checked out in the simulator, and had been well instructed on the instability of the X-2 by the other two pilots. His engineer's mind had worked out mathematically the exact flight profile that would coax the most out of the plane. He applied his formula on his first—and last—flight in the X-2.

Kinch flew chase and coached Apt into the proper firing position after drop. All 51 items on the check list checked off perfectly. Apt fired all burners on the X-2 and left Kinchloe at 50,000 feet. He set a new world's speed record going up. He even coaxed six unexpected seconds of life from the engine before it burned out. The Machmeter recorded Mach 3.20—2,178 m.p.h.—before he radioed "I'm turning." Except for a single eerie screech a few seconds later that radio remained forever silent. Cameras, instruments, and other evidence found in the wreckage told the rest.

Apt started a gentle turn and the X-2 suddenly jackknifed, inertia coupled, and went crazy. The young engineer fought valiantly but just couldn't move the controls faster than inertia tumbled the plane. He was smashed into the cockpit wall and pinned there by G forces. The camera recorded speed far beyond that of controlled flight. He regained consciousness briefly as he spun through 40,000 feet and tried futilely to gain control. Failing, he hit the ejection switch and blasted the nose capsule clear of the fuselage but the shock knocked him back into unconsciousness. Somehow he managed to ready for bailout. The canopy ejection was cocked, his seat belt and shoulder harness unhooked, but it was too late. The capsule struck the ground at terrific speed.

A few days later Kinchloe's F-104 flamed out just after takeoff. The F-104 has a downward ejection seat, not designed for use close to the ground. Kinch flipped upside down and ejected. But he, too, was too late.

The information recorded by Apt's X-2 flight became knowledge fed into the design of aircraft flying today. The X-15 was then mostly engineering drawings and wind-tunnel data bits being hand-built at North American Aviation in Los Angeles. One of hundreds of engineering changes in the X-15 provided a fully automatic escape system. All the X-15 pilot has to remember is not to fire the system on the way up because inertia will cause him to coast right on up alongside the aircraft.

Maj. Kit Murray took his knowledge and experience to Wright-Patterson AFB, Ohio, where he became the Air Force X-15 project officer. Wright-Patterson also became headquarters for the X-15 engine testing and the aeromedical experts who human-engineered the

Knowledge only from experience. Some knowledge is deadly.

cockpit with its new side stick control. The side stick spares the pilot a fight with G forces and zero gravity while flying this hottest of the world's airplanes.

At the end of Scott Crossfield's first powered flight in the X-15 in September 1959, the dart-shaped stainless steel research plane represented more than five million manhours of engineering and assembly work that cost $130 million. The small engine that kicked it to 1,500 m.p.h. that day was really two of the old type of X-1 engines stacked one atop the other. It produced only about a thousand pounds more thrust than the X-2. But the X-15 not only contained all the knowledge and experience gained in previous experimental aircraft, it contained more than twice the data-gathering instrumentation. One X-15 flight provides more data than the X-1 could collect in 30 flights.

The X-2 had 15 temperature pickups, no pressure-sensing devices, and only 550 pounds of instrumentation overall. The X-15 has more than 1,300 pounds of instruments with 600 pickup points telling temperature at every location, and 140 other sensors record pressures on the powerful rocket plane as it edges toward space. Even the MC-2 pressure suit worn by the pilot has 24 built-in electric contacts.

"When the X-15 flies," a North American spokesman said, "more than 1,000 questions are asked electronically from one to ten times each second. A flight surgeon watches radiocardiographs of the pilot's heart action and graphs of his body temperatures. Three engineers monitor certain critical pressures and temperatures as they are transmitted to the ground."

The wedge-shaped tail has high drag characteristics —deliberately. It gives directional stability and helps stop wild skids like the one that killed Apt. The ventral fin underneath that must be parachuted before landing gives the aircraft stability even when the angle of attack is so high that the upper control surfaces are effectively blocked out of the airflow pattern.

And the X-15 has a built-in stability augmentation system (SAS) that damps out any tendency of the aircraft to oscillate on the flight path and helps prevent inertial coupling. Similar but perhaps less elaborate systems have been incorporated into the design of fighter aircraft like the F-101, F-104, and F-106 for the same reason.

The XLR-99 "Big Engine" that powers the X-15 in its current data-collecting flights burns explosive anhydrous ammonia and delivers more than 57,000 pounds thrust, a half million horsepower—equal to that of seven Navy cruisers. By contrast, the Rocketdyne sustainer engine in the 5,500-mile *Atlas* missile has a thrust of 60,000 pounds. Scott Crossfield was once quoted as saying that cutting out the engines was about like hitting a stone wall with a truck.

Maj. Robert White who is now checking the X-15 for the Air Force, alternating flights with Joe Walker of NASA, confirmed Crossfield's report. White said that acceleration kept him pinned to his seat during the 125 seconds he burned the huge rocket engine to set his first speed record of 2,905 m.p.h. last March. This he accomplished with "minimum" thrust. Two weeks later Joe Walker used three-quarters throttle to set a new world's aircraft altitude record of 169,000 feet, 32 miles. Air friction heated the Iconel-X metal skin of the plane to nearly 600 degrees.

These pioneers enlarging the flight envelope carefully, step by step, are after more than sensational records. The records, like the technology, are a byproduct of applied science and knowledge gained as they shove back the frontiers of flight. Bob White has been described as a working pilot who wears flight clothes much of the time. He calls himself "an engineer who does most of his work sitting down." Test piloting, he says, is serious business and a science. Crossfield, Walker, and other test pilots look at the business in much the same way. It was Kinchloe, who couldn't afford to pay the premiums for added life insurance, that said:

"We're not courageous heroes, but men with intense scientific curiosity doing a job."

Crossfield has added that if they were not getting the needed information, "somebody else would be doing it."

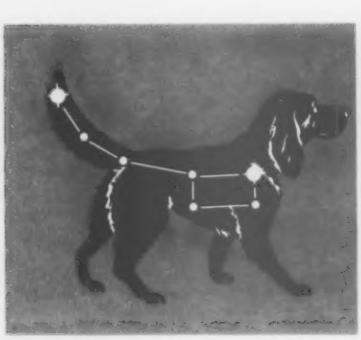
When the X-15 and its pilots can no longer contribute useful scientific knowledge in this nation's step-by-step exploration of the earth and the space surrounding it, a new vehicle and new men will be ready to carry on the research. Slowly, surely, the entire face and depth of the universe will be explored.

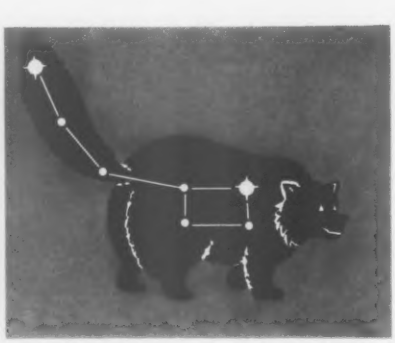
Knowledge comes home to work.

SLANTS ON SPACE

You compliment an astronaut by telling him he was the "cynosure of all eyes" at a particular event. Suppose you reword that and say you thought him the "dog's tail" of the occasion. Should you duck? Certainly not, if the astronaut has been properly briefed that Space phenomena include a linguistic fallout. The reworded compliment means exactly the same thing as the other one. How come?

We know that the North Star, Polaris, is located in the constellation we now speak of either as the Little Bear *(Ursa Minor)* or the Little Dipper.





To the early astronomers of ancient Greece, however, the arrangement of stars in this constellation suggested the imaginary outline of a dog, with Polaris near the tip of the upraised tail. So they named the constellation, *Cynosura.* Transliterated into English, the Greek words used were *kynos* (dog's) and *oura* (tail).

The reason that "eyes" became associated with *Cynosura* was because ancient mariners after dark, looked to the Dog's Tail for its Pole Star to check their courses. On land travelers by night did likewise to make sure of their bearings. As for the bygone astronomers, the star in the Dog's Tail seemed to be the central point in the heavens about which the whole visible celestial sphere seemed to revolve, hence it became a focal point for their attention as a reference guide in finding other star groupings.

To the imagination of later Roman astronomers, the distribution of stars in this constellation conjured up the outlines of a small bear, and therefore they renamed it *Ursa Minor.* Both the Greek and Roman watchers of the skies must have had unusually vivid imaginations to discern anything like the figure of a dog or cub bear in the starry configuration of this constellation. The resemblance to a little dipper is far more apparent, as any airman can verify by checking illustrations in any of the many popular beginner guides to astronomy now available in paperback editions.

In the writer's opinion, however, the Greeks could make a much better case for *Cynosura.* Numerous breeds of dogs do have long tails. No species of bear now known has a tail as long as that which the Romans gave the Little Bear. Consult any encyclopedia and you will find that in describing the physical appearance of a bear, there is invariable mention of the animal's very short tail.

At any rate, because *Cynosura* was once the focal point of attention in Space, it has since come to be applied to the center of attraction in human goings-on. For anyone looking for a Space name to give to a newly acquired pup, here is one of eclat and distinction.

JIV. JIX. Jive talk? No. Those are short-form designations for the fourth and ninth of Jupiter's twelve satellites. Sometimes astronomers use a space to separate the initial, "J," and the Roman numeral which follows, although occasionally there is none and the numeral may be rendered in small letters, as is often the case with "Jix."

The numerical designations of the giant planet's moons are based on the chronological order in which they were discovered. J XII, incidentally, was discovered just ten years ago by the U. S. astronomer, Seth S. Nicholson, his fourth successive such find. He began with the discovery of "Jix" in 1914; then added both J X and J XI in 1938, and finally increased Jupiter's satellite family to an even dozen in 1951.

Depending on the Moon's phase, the light shed by our natural satellite has a substantial amount in the infrared range which can run as high as about 75 percent of the total lunar radiations. Thus the Moon can be enlisted to facilitate the missions of space vehicles equipped with infrared photographic devices for geodetic, weather, and other research purposes. Even though a heavy overcast or 10/10 cloud cover may shroud our globe below a low-orbiting satellite, the invisible infrared light from the Moon gets through to the surface to increase the "dark" illumination of subjects for infrared photography.

Our Sun contains more than 99 percent of all the material which exists throughout the entire Solar System, according to current scientific computations. The exact percentage may be established with greater precision eventually, using data accumulated by Space research devices, but such an ambitious investigation program would require decades. —WILLIAM A. KINNEY

LETTERS TO THE EDITOR, continued

Future Teachers

Sir: I feel a sequel to SMSgt. Hal Bamford's *Teaching Tomorrow* would be a real service to your readers.

SSgt. Harry J. Marchek
Peterson Field, Colo.

• THE AIRMAN's *policy is for periodic articles concerning this profession. This is our fourth. Others will follow.*

Sir: I am interested in teaching after retirement and would very much like to obtain a copy of the DOD pamphlet you mentioned.

SSgt. Charles V. Jones
Amarillo AFB, Tex.

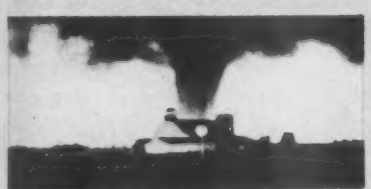
• *The pamphlet,* Teaching: A Second Career, *was scheduled for distribution in May and should be available through I & E sources.*

★ ★ ★

Tornadoes

Sir: I have just completed the article *Tornado Trackers* which appeared in your April issue and would like to know if the picture on page 18 is one of the tornado which struck Fargo, N. Dak., on June 20, 1957.

A3C Stephen C. Offutt
Vance AFB, Okla.



• *Airman Offutt is correct. This was the '57 Fargo twister.*

Sir: I think you have made an error in your April issue. On page 25, you identify the photo showing the aftermath of a storm as being in Ruskin Heights, Kans. I think Ruskin Heights is in Missouri.

SSgt. Robert E. Coomer
Grand Rapids, Mich.

Sir: Unless Ruskin Heights was moved by a later tornado since I left home, you'll find that it is in Missouri, not Kansas.

A2C Roy T. Casper
APO 937, San Francisco, Calif.

• *Our apologies to Missouri and these two readers.*

From the APs

Sir: I have just finished reading *Fight Before the Bell* in your April issue. As an Air Policeman, my pride was certainly excited by this explicit article. In SAC's intricate security system, the Air Police are proud to protect the defense forces while they are on the ground. Justice—not sympathy—will sustain the intrinsic motivations of these men. I'm sure that others not in the career field will be enlightened and will better appreciate our job after reading this story.

SSgt. Ronald L. Winford
Westover AFB, Mass.

Sir: I wish to express my thanks for the fine article on the Combat Defense Force. I hope this shows others that our job is not as easy and glamorous as it often appears.

A3C John B. Griffith
APO 677, New York, N. Y.

★ ★ ★

More on Bong

Sir: I read with pleasure your recent article on Maj. Richard Bong (*Ace of Aces,* Nov. '60 issue) and also the letter from General Moorehouse in your February issue. I am currently serving with the 9th Tactical Fighter Squadron which was one of Dick Bong's wartime outfits. We of the 9th still feel pride in his accomplishments and appreciate the fact that you have honored him in THE AIRMAN.

Lt. Ronald M. Gerkin
APO 123, New York, N. Y.

School Query

Sir: I am of Spanish descent and currently on active duty with USAF. I would appreciate any information available on assignment to the School for Latin-America located at Albrook AFB, Canal Zone.

A2C Rodolfo E. Enriquez
Andrews AFB, D. C.

• *Details regarding assignment and qualifications are contained in Chapter 9, AFM 35-11. Personnel officers should have specifics.*

★ ★ ★

Semantics

Sir: On page 37 of the April issue, you state that lapsed GI insurance cannot be reopened. Lapsed insurance can be renewed if the application is submitted before the policy's expiration date. Your answer is correct for expired insurance.

TSgt. Jesse J. Butler
USAF Academy, Colo.

• *Officials at VA headquarters indicate that, technically, Sergeant Butler is correct. In the past they have used these two terms interchangeably. They indicate that in the future they will use "expired" rather than "lapsed" to clarify their intent.*

★ ★ ★

Shoulder Patches

Sir: In your March issue, on pages 24 and 25, I noticed that several of the officers are wearing overseas bars and one a patch. I was under the impression this was no longer acceptable.

A1C George W. Miller
Ft. Myer, Va.

• *The latest revision of AFM 35-10 indicates shoulder patches are no longer authorized. Overseas bars, while discouraged, are optional.*

★ ★ ★

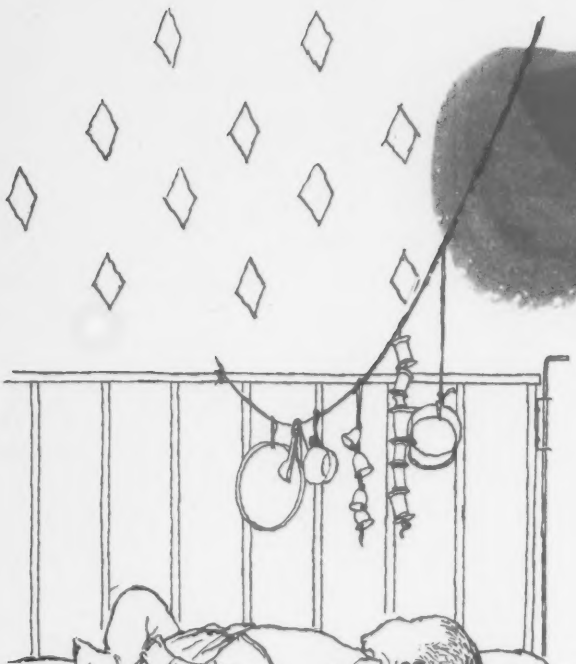
H-Models

Sir: In your March issue, you stated that a B-52H had flown with a full bomb load and air-launched two *Hound Dog* missiles. However, the H-model was not flown until March 6, 1961, and your magazine was released in mid-February.

TSgt. Bruce O. Trione
Wurtsmith AFB, Mich.

• *We could say this is journalism at its best. We could also say we're clairvoyant. But the truth is, we jumped the gun.*

Can Handica



by DAVE KARTEN, Airman Staff

AT A MIDWEST AIR BASE RECENTLY an officer and his wife celebrated the second birthday of their only child. Johnny was a sweet, happy baby. But somehow he didn't seem to develop as rapidly as the children of their friends and neighbors. He was also slow in learning to sit up, slower in learning to walk, and he still couldn't speak at two years of age. "What can we do to help him?" they wondered.

At an overseas base not long ago an airman's wife stood beside a crib staring down at her physically handicapped eight-month-old boy. She asked the same agonizing question.

The sense of hopelessness that afflicts these members of the Air Force family points up an acute problem: what to do about several thousand Air Force youngsters who are physically or mentally retarded?

Mental retardation is one of the greatest tragedies in mankind's experience. Because of it millions and millions of people from all social groups have been prevented from achieving full status as human beings.

Today, there are more than five million mentally retarded persons in America. A million and a half of these are school-age children. This means that 30 out of every 1,000 youngsters in this country are retarded. This same proportion is generally reflected in the number of handicapped children among Air Force families.

No other handicap can claim so many victims. Three percent of the U. S. population is so affected. Four million American families face the problem.

What is a mentally retarded child? Each year some 120,000 American couples are compelled to learn the answer. They become the parents of children whose minds never fully grow up. It may be because of brain injury during birth or the infant years, or because of some chemical disorder or for reasons yet unknown. Medical and social researchers have located more than 90 different causes of mental retardation. Whatever the cause, these children learn in slow motion, and most of them never go beyond the mental level of normal seven- to twelve-year-olds. Some reach only the level of four- to six-year-olds.

Until a few years ago there was virtually no hope of help for these children. They were treated like social outcasts, sources of embarrassment, as well as economic burdens to their families. Now, due to medical research and the devotion of thousands of educators and interested volunteers, they are being helped.

Until recently the panic-stricken parents of retarded children could go nowhere for constructive advice. For most families, only two alternatives existed, and each was appalling:

They could send their child to an institution—usually vast, overcrowded, and regimented, a place where children vegetated in custody.

Or they could keep him at home. This was the choice of 95 percent of the parents, and it usually meant that local public schools would reject the child, that neighboring children would taunt him, that he would remain alone, idle and useless, until the day his parents died and he became an added burden on the state.

These children, however, could have been effectively trained. Millions of the retarded can become at least partially self-sufficient, able to do simple, repetitive work in industry, on farms and in homes, and in special workshops. With help, they can meet the social demands of rural and urban life. All but a fifth of them can become contributing members of society, enjoying feelings of achievement and a life of their own.

But for centuries it was considered so shameful to have a mentally subnormal child, so much a sign of bad heredity or immorality, that the only recourse left to parents was secrecy. A huge population—a group totaling more than the blind, the polio-crippled, and the cerebral-palsied put together—was thus hidden away.

ed Children Be Helped?

Then, a few years ago, a scattering of parents found the courage to defy public opinion and their own unreasoning fears. In New York City, in 1949, the movement began with an inconspicuous notice tucked away in a newspaper. The advertisement read as follows: "I am the mother of a gentle and lovable child whom doctors term hopelessly feeble-minded. My son is without playmates, without education of any kind. Surely there must be other parents like myself. Where are you? Let's band together and *do something* for our children!"

The ad had an impact like a golf ball filled with U-235. Only a dozen parents answered this desperate appeal but the newspaper had assigned a reporter to cover the meeting, and a feature article appeared the following day. Thus it was that at the next meeting more than 200 parents were present, among them housewives, a doctor, a plumber, and a college professor. Worried, suspicious, and hesitant, they were at first a silent group. Then a few of the parents began to tell what they had so long repressed: the story of their outcast children, of the closed doors and the frantic search for help. And that very night, before they left for home, these parents formed the New York State Association for the Help of Retarded Children.

But the care of physically or mentally handicapped children in the Air Force family presented a special problem. Many USAF parents with such children who were educable or trainable found themselves unable to qualify as residents of a state. Result: their children could not attend state-sponsored classes for handicapped youngsters and they were forced to meet a constant and almost insurmountable financial burden.

For many years Air Force medical facilities were faced with the problem of USAF parents seeking assistance for care or treatment of a handicapped child. In most cases the medical facility was unequipped to offer any kind of assistance and the distraught parents had to be turned away.

Then a group of Air Force wives decided to do something about helping USAF parents with handicapped children so that they wouldn't have to "go it alone." A self-help program, organized in PacAF in 1957, sponsored discussion meetings attended by doctors, chaplains, Special Services, the base school teachers, wives club officials, and parents of children who needed special schooling or training. Announcements in the base daily bulletins invited interested parents to meet and form an organization. At Tachikawa AB, Japan, 17 people attended the first parents' meeting in September. Fifty-four parents attended the second meeting four months later.

Then the Officers' Wives Club at Hickam went to work on the problem. They located all the special schools, classes, homes, and hospitals where "exceptional" children could be cared for. They published this information in a booklet: *Love and a Little More,* and conducted educational programs at which lecturers were

Parents do not feel so alone when they have an opportunity to talk over their problems with others facing the same situation.

Drawings courtesy of Children's Bureau, U. S. Department of Health, Education and Welfare.

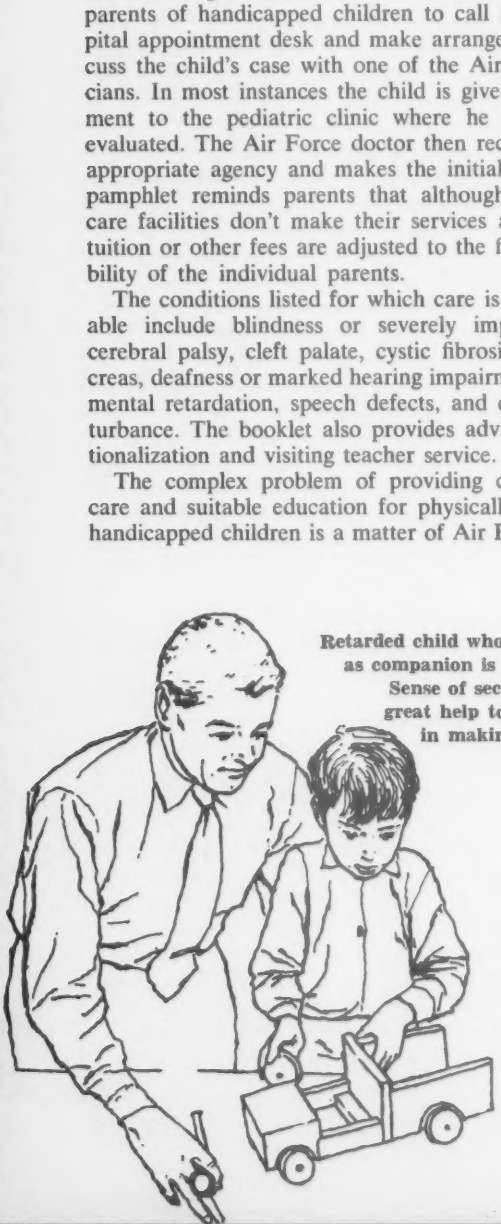
invited to address the parents. The Air Force wives groups found that organization of USAF parent groups provided a means of educating them in the ways of assisting their children. But perhaps even more important, it let the Air Force parents know they were not alone with their problem.

At about the same time SAC, AU and PacAF were working on similar projects. Air Force bases like Offutt AFB, Nebr., Barksdale AFB, La., and Hickam AFB, Hawaii, took steps to provide all possible help to USAF parents.

Offutt published a pamphlet entitled, *Have You an Exceptional Child?* It contained information on education, training, and diagnostic facilities located in the area near the base. It was compiled by an Officers' Wives Club committee with assistance from the professional and administrative staff at the base hospital. Included as general information is a statement directing parents of handicapped children to call the base hospital appointment desk and make arrangements to discuss the child's case with one of the Air Force physicians. In most instances the child is given an appointment to the pediatric clinic where he is thoroughly evaluated. The Air Force doctor then recommends the appropriate agency and makes the initial contact. The pamphlet reminds parents that although these child-care facilities don't make their services available free, tuition or other fees are adjusted to the financial capability of the individual parents.

The conditions listed for which care is usually available include blindness or severely impaired vision, cerebral palsy, cleft palate, cystic fibrosis of the pancreas, deafness or marked hearing impairment, diabetes, mental retardation, speech defects, and emotional disturbance. The booklet also provides advice on institutionalization and visiting teacher service.

The complex problem of providing costly medical care and suitable education for physically or mentally handicapped children is a matter of Air Force concern.



Retarded child who has his father as companion is very fortunate. Sense of security will be of great help to the youngster in making adjustments.

Unfortunately, however, the limitations imposed by law frequently make it impossible for Air Force medical facilities to provide comprehensive medical care. Limitations of local public school systems in special education facilities present another barrier. The cost of private education, private medical attention, and institutional care is, more often than not, prohibitive even if they are available in the local area. And seeking satisfactory solutions for these seemingly insurmountable problems can have an adverse effect on the morale of the entire family and the airman's productivity.

What Can Be Done

To help the retarded a program must be set up which will provide the greatest possible help to the child and also give the comfort so needed by the parent. This involves a special decision in each individual case and it demands serious deliberation.

For example, one child may be damaged intellectually and obviously needs constant supervision and much physical care. His Air Force parents may be unable to meet the constant demands that his presence makes on all its members. He needs a place where he is protected. Whether it will be a private or state-operated institution will depend on the availability of the services to a member of the Air Force who is a non-resident of the state and the extent of the family finances. In any event the child needs a place where whatever abilities may be dormant within him can be drawn out through an understanding educational program.

Another child whose degree of retardation, for example, is less than in many children, can be trained in a day or residential school. Except for his or her childishness, this child would present little problem in care. But because this type is so susceptible to disease, any illness must be brought to the immediate attention of a physician.

A youngster who is emotionally disturbed needs a 24-hour atmosphere of regularity, steadiness, and peace where he can experience the feeling of success in personal relationships, in learning new skills, in developing physical prowess. When his emotional disturbance eases or disappears, his subsequent development may be impressive.

These are but a few of many problems retarded children present. They show that a good diagnosis, involving many varied examinations, may suggest therapy quite different from the usual program of education and training.

Education and Training

Although the cause of retardation and of possible future prevention is primarily a problem for scientific teamwork, the basic elements in the rehabilitation of the child are educational. As one teacher at a school for handicapped children explained: "Since he learns more slowly we must refine our methods of teaching him and evaluate the usefulness to him of those things which we ask him to learn."

In former years these children were not only scat-

tered, but little understood, and the first specialized training for them was in private residential schools.

As the years passed more residential institutions and schools, public and private, were founded by men who saw the plight of retarded children and sought to establish centers for their assistance. These schools and institutions are of three types:

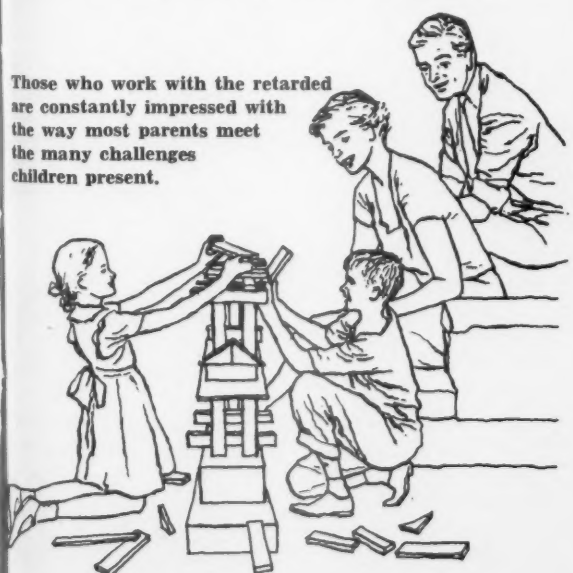
State-operated schools which offer permanence of existence and rates adjusted to the parents' income. Of necessity, they must handle greater numbers than a private school.

Private boarding schools, which deal in smaller numbers, and can offer more individual attention to each child.

Community day schools which provide instruction while permitting the child to live at home. For children who can be cared for at home without too much difficulty, these schools are of great value to the parent. Day schools may be part of the public school system, or may be supported privately by groups of parents. Public schools for years have had special education classes for educable children who border the low normal group. More recently many cities have set up special day classes for trainable children. These classes are still too new to evaluate completely, but they serve many types of retarded children.

The Older Child

When a retarded child grows too old for the program or grows beyond the legal age for inclusion in the public school system, parents are confronted with a new problem. If by that time he is able to carry on satisfactorily in society, or if he can be absorbed in the home, there is little difficulty. If neither of these is possible, and if institutionalization of some sort is indicated, it will not be easy to find many schools ready to accept children of such advanced ages. Much grief can be avoided if the original diagnosis and month-by-month appraisal of the specialist is accurate enough to forecast the situation so that some preparation can be made.



Those who work with the retarded are constantly impressed with the way most parents meet the many challenges children present.

New skills, new habits can be taught. Companionship for the retarded depends on knowing how to do things.

Home May Be Best

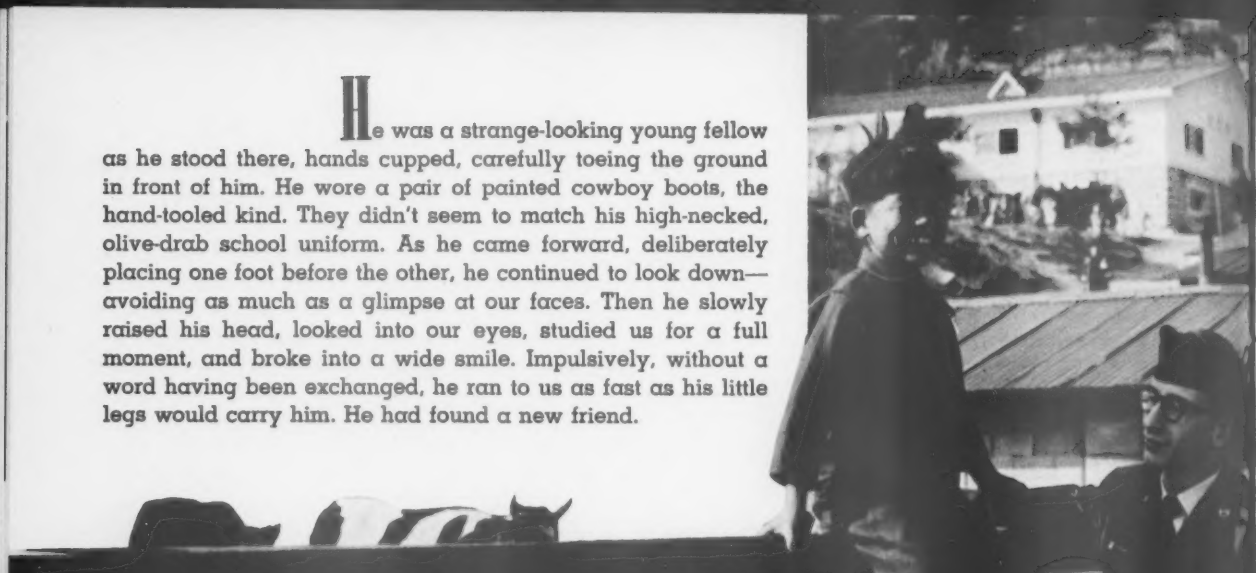
The home is still the place where many retarded children live out their lives. The home may be best for many but their care presents many problems. However, progress is being made. Some states now provide home instruction for infants, children under six, and their parents. An effective example of this service is sponsored by the New Jersey Department of Instiutions and Agencies. It provides parents with suggestions on how to care for and train their child in the home. It offers workbooks, games and recreation suggestions for the child in a type of home-visitation instruction heretofore offered by visiting teachers to the homes of "shut-ins." This guidance has greatly lightened the burden of the parents, though many problems still remain in trying to care for the mentally retarded in the home, particularly as they become adults.

But thanks to the volunteer efforts of many dedicated Air Force wives, chaplains, personnel services officers, doctors, and educators, there is new hope for the retarded Air Force child. The USAF is again proving that it "takes care of its own" by its effort to eliminate misunderstanding, shame, embarrassment, and the incalculable loss in terms of human suffering.

As the well-known novelist Pearl S. Buck wrote in 1949 about her own retarded child:

"In every age, however troubled, there are always heartening events. One of the most encouraging, in our times, is the awakening of the public to the needs and rights of the mentally retarded child. He has for too long been the hidden citizen, the forgotten one, but thanks to those who know of his plight and his potentiality, he is coming into his own. Those who know him best are his parents and his teachers, and from them now arises the vision of prevention of at least some of the causes of mental retardation, and certainly of at least amelioration of the lot of the mentally retarded child. Let us be grateful, not only for the sake of the child but also for the sake of our civilization. The test, I say again and again, of any civilization is the measure of consideration and care which is given to its weakest members."

He was a strange-looking young fellow as he stood there, hands cupped, carefully toeing the ground in front of him. He wore a pair of painted cowboy boots, the hand-tooled kind. They didn't seem to match his high-necked, olive-drab school uniform. As he came forward, deliberately placing one foot before the other, he continued to look down—avoiding as much as a glimpse at our faces. Then he slowly raised his head, looked into our eyes, studied us for a full moment, and broke into a wide smile. Impulsively, without a word having been exchanged, he ran to us as fast as his little legs would carry him. He had found a new friend.



Glimpses of Life on the

KOREAN FRONTIER

by 1st Lt. CARROLL S. SHERSHUN, Airman Staff

For little Charlie Su Kim this scene has been repeated dozens of times. Charlie is an orphan. At six he's not very large, but he is a symbol of the warm friendship shared by U. S. airmen with the people of Korea.

A decade has passed since the well-known "conflict" started. Battling continued more than three years, ending in an uneasy peace on July 27, 1953. Over the years, U. S. airmen have remained on duty in a land which has been likened to "a sore thumb on the great paw of Asia."

The Republic of Korea isn't a very large country, as nations go, but USAF's role there is one of the most important in its network of overseas bases. Brig. Gen. James B. Tipton, 314th Air Division commander says, "Our job in Korea is one of the most challenging and interesting which airmen can experience short of one in an active combat theater."

Even the newest "green bean," a title reserved for all new arrivals in Korea, is impressed with the nearness of the communist threat. All organizations operate in a state of constant preparedness. For most airmen in Korea, duty is at Osan AB, home of the 314th Air Division, or Kunsan AB. Many other airmen are scattered throughout the peninsula at isolated sites or serve with the Air Force advisory Group at the network of Republic of Korea Air Force bases. Under USAF's guidance ROKAF, equipped largely with F-86 *Sabres*, has become a highly effective defensive force. In an emergency USAF units throughout the Pacific, including those on the key island bastion of Okinawa, would be available within hours.

Airmen and People

But it doesn't take long for the newcomer to learn that the USAF story in Korea isn't confined to the silvery jets which maintain a constant defense vigil. The real story of USAF in Korea is one of how its airmen have adjusted to being away from their own families and how they as individuals are contributing to USAF's goal—keeping the peace.

When you look for something unique about our airmen in Korea you find it in the spirit with which they've merged normal duties and their equally important roles as "good will ambassadors." In probably no other nation does the "People-to-People Program" have greater impact.

The first and most crying need for help came in the form of orphanage support. It has been over 10 years since the National Children's Home of Korea, where Charlie Su Kim lives, was founded. In October 1950,

when bitter fighting swept back and forth across the tiny peninsula, thousands of children were left without parents. A temporary shelter was set up at the present orphanage site.

When the government of the Korean Republic was forced to retreat from the area the children were taken to nearby Inchon. Seven babies froze to death while awaiting evacuation ships. Witnessing the children's plight USAF Col. Dean Hess, then senior advisor to the ROK Air Force, made arrangements for 16 big transport planes to be rushed from Japan. In turn 907 children were airlifted to the safety of Cheju Island. They returned to Seoul after hostilities ended.

Today the orphanage is home for 295 youngsters. It boasts a Texas-style corral, which accounts for Charlie's boots, complete with a Lone Star flag and 20 head of Ayrshire cattle donated by Texas cattlemen.

While most contributions aren't as spectacular as the "cow-lift" which brought a daily supply of fresh milk, donations continue to come in from servicemen stationed throughout Korea. Every weekend finds men from Osan AB traveling more than two hours each way by bumpy jeep to visit Charlie and his friends.

Today hundreds of orphanages dot the Korean countryside. Many are financed by individual Air Force units. Practically every squadron has "adopted" its own orphanage. One of the larger hostels is supported entirely by worldwide contributions from AACS personnel. In addition to the dollars they have given, airmen spend much of their free time cleaning, painting, and repairing these homes. Most welcome from the youngster's viewpoint, however, is the companionship of the airmen themselves.

But expressions of good will between Americans and Koreans aren't restricted to orphanages. An extensive program, known as "Mutuality," is bringing together the people of both nations in virtually every occupation.

One USAF master sergeant, Eugene Hoops, has been honored by Korea's agricultural ministry for his aid in introducing many modern American farming techniques. Much of his pay was spent to purchase farm implements from the U. S. One of his simplest, yet most effective, contributions was the introduction of the hand scythe in gathering rice. Sergeant Hoops has since moved along to a new assignment in Japan, but continues to correspond with his Korean friends.

Brotherhood at ZX

Even the smallest USAF installations boast good neighbor policies. Tiny ZX Homer is a lonely spot, but it's one of the best examples of brotherhood in the far-flung global network of USAF installations.

"Remote duty" and ZX are synonymous. The site's total complement consists of two airmen and a Korean civilian. They work—and live—in a three-room farm house. Except for radio and telephone their only contact with other airmen is with a truck driver who once or twice a week negotiates a hazardous, stream-fording narrow dirt road to deliver food and water rations.

"But we aren't lonely," claims A2C Lynual "Tom" Dooley. "We don't have time to be," adds A1C Jim Dilworth.

Not only have Tom and Jim "adopted" a 16-year-old Korean youth, but they teach English and cooking to local high school students in the village of Chan An Min. Jim boasted 14 students in his American-style cooking class. "We didn't have an American-style stove to cook on, but I did pretty well with their charcoal-filled hibachi (pot). Our food was so different that they really enjoyed it, especially the hot dogs."

Besides teaching conversational English to local villagers Tom, like many airmen in Korea, also finds time to work on an Extension Course Institute correspondence course. "There's something about the solitude here," smiles Tom, "that lets us be at peace with ourselves. It seems we're always cooking up a new project of some sort."

One of their "projects" is another fellow named Charlie. Now 16, Charlie was orphaned during the Korean conflict. He had been doing odd jobs ever since. One day he asked Tom and Jim if they'd like him to serve as their "house boy," making beds, shining shoes, and cleaning the farmhouse yard.

"Instead," relates Tom, "we talked him into letting us outfit him and return him to school. He was grateful for the opportunity, so we pooled our money and

Replanting of delicate rice shoots in traditional manner takes many long hours of tedious and disagreeable work.

bought him the traditional black school uniform. Even though he's a little old he doesn't mind being in the seventh grade."

Tom and Jim aren't unlike many other airmen stationed throughout Korea. "We're anything but isolated when you consider how many friends we've made in the short time we've been here," observes Jim. "Even the mayor visits us regularly. I sure miss my family, but this duty has really taught me how important a job we have here. The reward comes when the kids wave at us whenever they see us and especially when they greet us with their newly learned English."

Be It Ever So Humble

Not too far from Chan An Min is the Koon-ni Bombing Range.

Located on the shores of the Yellow Sea, where huge 19-foot tides advance and retreat almost two miles, Koon-ni offers a quiet life for its seven USAF inhabitants. They have neither television nor movies. The hustle and bustle of metropolitan life is far behind.

Several times daily the quiet solitude which prevails is punctuated by the site's klaxon—a clanging cacophony played wildly on an expended jeep wheel rim that hangs from the eaves of the site's dining hall. With all semblance of tranquility abandoned, frenzied activity follows the ear-piercing alarm. A flight of USAF aircraft on a practice mission has just radioed that it's headed for the range.

Moments later four dots appear on the horizon. Within 30 seconds the quartet, F-100 *Super Sabres* from nearby Osan AB, zoom by to survey their target, then peel off into individual "attack" positions. On the next pass each performs an intricate maneuver and releases his practice bomb, which contains only a small smoke-and-powder charge. Fully 60 seconds elapse before the bomb hits its target—long after the supersonic jet has blended with horizon.

As the tell-tale powder puff erupts from its spent shell a sergeant shouts out its coordinates. Two other airmen phone in figures from their tower locations, each a mile from the range's tiny compound. A sergeant rapidly draws three lines on the grid chart in front of him. In less than a minute the pilot's converted score has been radio-relayed to him.

Next come the more conventional skip-bombing passes. Skimming across the nearby rice paddies at blazing speed, scant yards above the ground, the lead pilot takes aim on his 12-foot-wide canvas target which is strung vertically between two poles. It sort of reminds you of a football quarterback hurling a 60-yard touchdown pass as he releases his shell some 300 yards shy of the target. It's an awesome sight as the bomb rips through the canvas. Bull's eye!

But there weren't any cheers from the observation tower as the bomb ripped through the heavy cloth target and tore it to shreds. "The boys will have to spend over two hours repairing it," announced Charlie Corcoran, the strapping six-foot three-inch lieutenant who commanded the site, "and that kills their hunting plans for this evening. From the number of targets we've lost

lately we're glad that they're on our side."

For the seven men at Koon-ni life is somewhat different from the daily routine of an airbase. Once a month they get to visit Osan AB, a three-hour ride over rough country dirt roads. Their most valuable import —mail—arrives only once or twice a week. It comes in with food and other essentials which are airlifted from Osan when weather permits. Water is trucked in once a week.

Spare hours are spent hiking over nearby hills in quest of elusive pheasants and ducks which abound in the region. "We also try to be good neighbors and do our share to help the Koreans who live near us," adds Lieutenant Corcoran. "We've repaired the road and frequently welcome the Koreans to our site."

Duty at Koon-ni isn't without its humor, which is best reflected by the site's unofficial motto: "Be it ever so humble, Koon-ni is no place like home."

Watch Your Compass

The threat that lies beyond Panmunjom is always present. When you land at Kangnung, on Korea's east coast, the first thing you notice is a large hand-painted sign in front of the quonset that serves as base operations. Its message, which has triggered many a smile, is also a reminder of the uneasy peace which prevails:

"You are only six miles from the buffer zone. Watch your compass. To hell with your altimeter!"

Kangnung is now a ROK Air Force aircraft control and warning site. Located near the DMZ (demilitarized zone) it is tremendously important to the safety of free Korea.

It would be Kangnung's duty to flash the word which would send antiaircraft crews to their guns, fighter planes into battle, ground troops to prepared positions, and women and children to their shelters.

Tucked away in one area of the base is the only USAF air station on Korea's Japan Sea coast. As you talk to the 12 airmen and 5 officers stationed there you become increasingly aware of their closeness to the DMZ. They frequently refer to June 1950 when communist troops stormed across the 38th parallel to violate the territorial integrity of the Republic of Korea.

Koon-ni Range's most valuable import, mail, arrives by helicopter once or twice each week. Food and other supplies are also airlifted from Osan AB.

Jim Dilworth draws an outline map of his native s for A/2C "Tom" Dooley and Hwang Sang Pok. Trio s up entire staff of remote ZX Homer beacon site.

Farmer carrying his heavy load of watermelons to market in A-frame harness, and girl with baby laced to her back, are common sights throughout Korea.

They know it could happen again.

Their established work day is eight hours. But they've hauled gravel, mixed concrete, poured sidewalks, installed water pipes, painted buildings, and performed dozens of other chores to improve their site. The combination of plenty of work to keep them busy and knowing why they are there has had a lot to do with existing high spirit.

The men are a lot like those stationed at any of the many isolated locations in Korea. MSgt. John Venezia, a 17-year veteran, teaches English conversation to youngsters in the village. It helps fill the void caused by not seeing his own children, nine-year-old Rose Marie and five-year-old Mike. Most of the men aren't married. For them the 13-month tour doesn't seem quite so long.

Airborne Jeep

Among the many unique aspects of life in Korea is the transportation system. The L-20 *Beaver* has replaced the jeep for trips of any distance. Known as "chogie" flights, the L-20s link the land with a latticed aerial network which reduces to minutes travel that would otherwise require hours of hazardous driving.

"Chogie," incidentally, is the Korean word for "over there." How far over there is determined by the length of the "oh" sound. A cross-country flight from Kunsan AB in the southwest to Kangnung would be more like a "chooooooogie" flight.

They kid about the L-20, too, but with somewhat the same reverence reserved for the C-47 "Gooney Bird." The C-47s still handle overwater flights to such locations as P-Y Do, a tiny ROK island in the Yellow Sea. Located north of the DMZ and only three miles from the closest communist territory, P-Y Do's sandy beach is the only runway. All takeoffs and landings are made during low tide.

Uniqueness is perhaps the most descriptive term for many of the USAF assignments in Korea. Two of the most distinctive roles were played until recently by A1C Dick Nikolaisen and A2C Larry Coleman. Prior to completing their Korea tour earlier this year the two tall, trim airmen were the only USAF members on the 110-man United Nations Honor Guard. The spit-and-polish ceremonial unit is made up of British, Turkish, Thailand, Ethiopian, Korean, and U. S. Army troops.

"I'll miss this assignment," Dick said just before leaving for his consecutive overseas tour in Bermuda, "especially the fun we've had teaching 'English' to our British friends. It took them by surprise that our canteens weren't restaurants, but what they call 'water bottles.' "

It takes more than 30 minutes to dress for a formal ceremony. "When we wear our summer uniforms we have two men lower a third into his trousers to keep them wrinkle free," offered Larry. "You can't explain the feeling," he added, "but there's something that goes on inside me that makes even the hair on my neck stand at attention during one of those formal inspections. I guess it's pride. It's a good feeling."

Both Larry and Dick served as air policemen at Osan AB before they were selected for their U. N. Honor Guard posts. While at U. N. Headquarters in Seoul their day started with typical Army reveille at 6:15 a.m. and included an hour of physical training every day.

Larry best expressed the uncertainty of USAF life in Korea: "It's a funny thing about this assignment. It has been a darn good experience, but I've been doing just what I joined the Air Force not to do—serving with the Army!"

That's the story of U. S. airmen in Korea.

It's a lot like service anywhere; yet it's different.

It's a many-faceted story of quality, professionalism, and preparedness . . . blended with a goodly amount of good will. It's a serious story, with plenty of humor.

CHIEF OF STAFF, USAF

General Curtis E. LeMay

On July 1, 1961, General Curtis E. LeMay became the fifth Chief of Staff of the Air Force since it attained autonomy as a separate service in 1947.

General LeMay was born in Columbus, Ohio, on November 15, 1906. He was graduated from Ohio State University with a Bachelor of Engineering degree in June 1928. His Air Force career began at Selfridge Field, Mich., where he was assigned as a second lieutenant on completion of flying training at Kelly Field in 1929.

In 1937 General LeMay participated in the first mass flight of B-17 *Flying Fortresses* to South America. The following year he made the second long-range formation flight to the South American continent which won for the entire group the Mackay Trophy for outstanding aerial achievement.

At the beginning of World War II General LeMay pioneered the air routes over the South Atlantic to Africa and over the North Atlantic to England. He organized and trained the 305th Bombardment Group in 1942 and led that organization to combat in the European Theater. Fundamental procedures and techniques developed under his leadership were later adapted to the B-29 *Super Fortresses* which fought the war to its conclusion in the Pacific.

Transferred to the Pacific in July 1944, General LeMay commanded the 20th Bomber Command, with headquarters on Guam, and later became Chief of Staff of the Strategic Air Forces in the Pacific. At the conclusion of the war he returned to the United States piloting a *Super Fortress* on a non-stop record flight from Hokkaido, Japan, to Chicago. In late 1945 he became the first Deputy Chief of Air Staff for Research and Development.

In October 1947 General LeMay was selected to command the U. S. Air Forces in Europe with headquarters at Wiesbaden, Germany. In this capacity he organized and directed initial air operation for the historic Berlin Airlift. A year later he returned to the United States to assume command of the newly formed Strategic Air Command, and established its headquarters at Offutt AFB, Neb.

As Commander in Chief of SAC for nearly 10 years, General LeMay built an all-jet bomber force with global capability, and under his leadership and supervision plans were laid for the development and integration of intercontinental ballistic missile (ICBM) capability.

In July of 1957 the General was appointed Vice Chief of Staff of the U. S. Air Force and served in this capacity until his present appointment as Chief of Staff. General LeMay is an active, jet-qualified Command Pilot.

VICE CHIEF OF STAFF, USAF

General Frederic H. Smith, Jr.

Gen. Fredric H. Smith, Jr., appointed Vice Chief of Staff, USAF, on 1 July, was born at Fort Monroe, Va., June 30, 1908. He attended the U. S. Military Academy at West Point and was graduated a second lieutenant of Field Artillery in 1929. The following year he was transferred to the Army Air Corps after attending Primary and Advanced Flying Schools at Brooks and Kelly Fields, Tex. His first assignment with the Air Corps was at France Field, Panama Canal Zone.

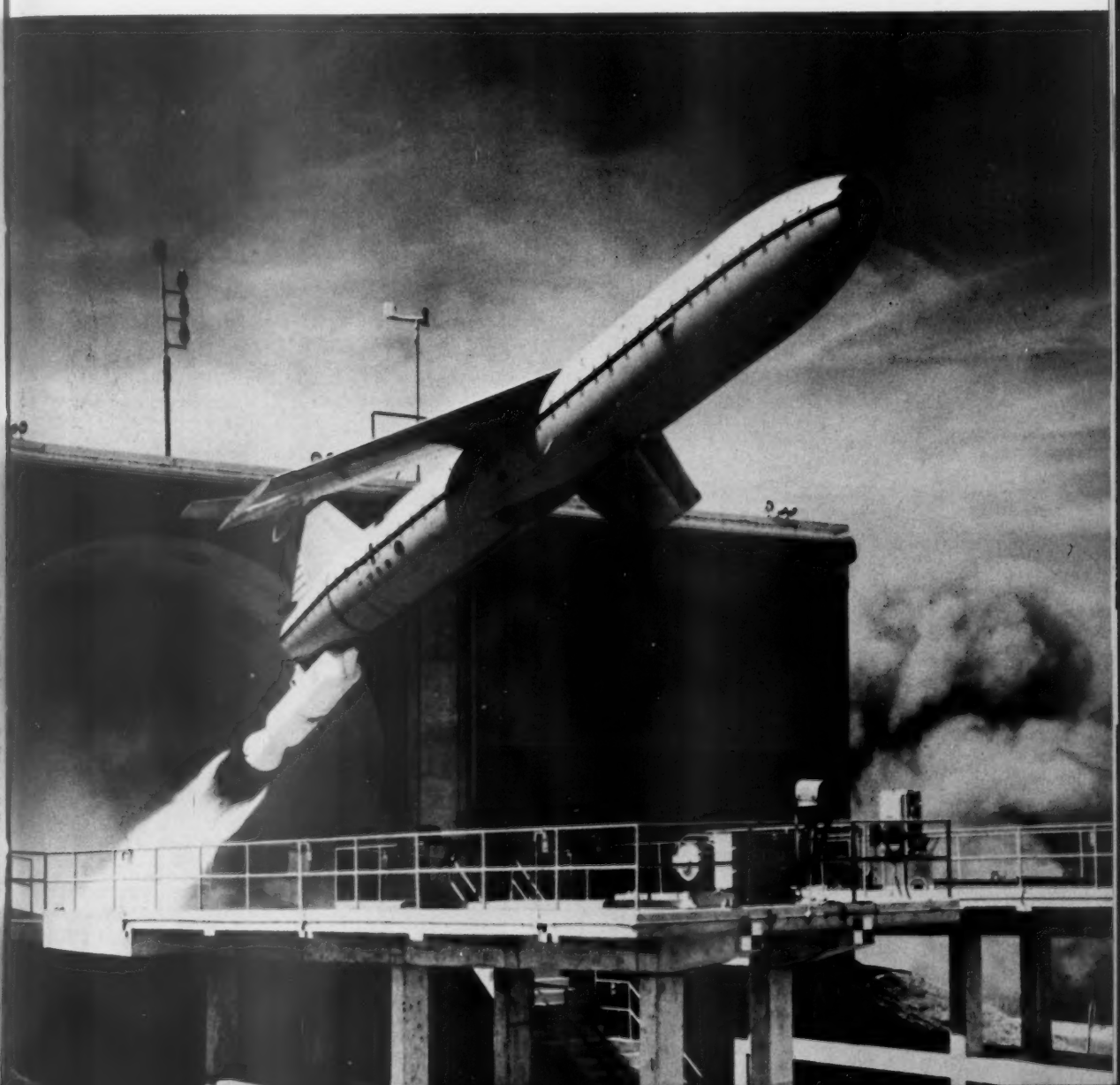
In January 1942, General Smith took the 8th Pursuit Group to the Southwest Pacific and later in the same year became Chief of Staff of the advanced echelon of the newly activated Fifth Air Force. Following two years of combat in the Pacific, he was transferred to the ETO where he served as Deputy Senior Air Staff Officer and Chief of Operations for the Allied Expeditionary Air Forces. In February 1945 he returned to the Southwest Pacific to direct the Fifth Fighter Command until conclusion of the war.

Following the war, General Smith served successively as Chief of Staff for SAC, National Commander of Civil Air Patrol, as well as in assignments at Headquarters USAF. In 1957 he returned to the Pacific as commander of Fifth Air Force and Commander of United States Forces, Japan.

In August 1959 General Smith assumed command of U. S. Air Forces in Europe and of the 4th Allied Tactical Air Force (NATO) in which capacities he served until his present appointment as Vice Chief of Staff USAF.

AIRMAN'S WORLD

HARD SITE FOR THE NATION'S OLDEST MISSILE PROGRAM. A *Mace B* tactical missile explodes from a prototype hard site at Cape Canaveral, Fla., as a climax to TAC's six-month training course at nearby Orlando AFB. The "B" model is the newest in a line which began with the *Matador* "pilotless bomber" of 15 years ago. Currently, *Matador* and *Mace A* squadrons are on alert and deployed throughout several overseas areas.



Modern Communications

Aircraft and missiles are not the only sonic-speed items utilized in today's airman's world.

Installation of a unique information system now provides California-based engineers with instant data on which to evaluate *Hound Dog* missile tests conducted in Florida.

Telemetry equipment has been installed in the test missiles. As the GAM-77 flashes down the missile range, flight data are transformed into beeps, chirps, and hums, and relayed to California via a leased-telephone line within .018 seconds.

At Downey, Calif., electronic equipment converts the tones into digital "bits" which are punched on cards and processed through a second computer. Engineers then plot the results on graphs and a final picture is available within hours.

Previously, such information was recorded on magnetic tape in Florida and flown to California. The result was a loss of several days before conclusions were available. Now a missile may be captive-flown one day, flight data processed the same day and, if no bugs crop up, free-flown the following day.

HI-FI

A resident of Neuerburg, Germany, has pointed a new finger of guilt at the jet age's most persistent fall-guy—the sonic boom.

The gentleman claims that he recently opened his living-room windows to enjoy the gentle breezes of spring. Minutes later, an Air Force jet shattered the quiet of the Eifel countryside. Almost instantly, the boom was followed by a metallic echo.

Later examination disclosed the piano was out of tune. His conclusion—the sonic blast had stretched the piano strings.

Safe Light

Officials at USAF's Aeronautical Systems Division (formerly Wright Air Development Division), Wright-Patterson AFB, Ohio, have announced development of an explosion-proof lantern.

Designed to reduce hazards during internal repair of B-52 and KC-135 fuel tanks, the three-battery-operated light will provide illumination for eight hours. It is constructed of brass and aluminum-no-sparking materials. The case connection and leads are cut- and tear-proof.

Filaments are designed to cool quickly in the event of a broken lamp. However, as a double safety feature, should a break occur, the lamp is also designed to pop out of the socket thus breaking contact.

AIR FORCE AND ARMY **technicians get together to inspect a full-scale model of a nuclear power plant which will begin providing heat and electricity for USAF's radar station at Sundance, Wyo., later this year. A single-core loading will sustain the plant for a two-year period. TSgt. Robert Ulrich and Army SFC Norman Raskin will be two of the inter-service team members who will be responsible for the PM-1's operation. They are currently training at the Martin Co. Nuclear Division in Baltimore.**

Bits of Blue

. . . USAF welcomes a new major command this month. Air Force Communications Service assumes control, on a global basis, of all point-to-point, air and ground communications facilities under USAF jurisdiction.

. . . First checks in payment of the $230 million "special" GI insurance dividend announced recently by President Kennedy will go into the mails the first of the current month. Payments are expected to be completed by Labor Day.

. . . Maj. Arthur "Kit" Murray, who established a world's altitude record of more than 90,000 feet in the X-1A in 1954, recently retired from active duty. His last assignment was as chief of the X-15 Weapons System Project Office.

. . . Eglin AFB, Fla., received

RECENTLY ANNOUNCED MODERNIZATION **of the MATS fleet will include more than 100 Lockheed-built aircraft similar to this artist's conception. Powered by turbofan engines, the huge carrier will be approximately twice the size of the currently operational C-130. Its capabilities will include the ability to haul 10 tons of cargo, nonstop, more than 6,000 miles or the equivalent of the distance from California to Japan.**

the first General Thomas D. White Wildlife Conservation Award in recognition of USAF's "most outstanding conservation program during 1960."

. . . USAF's first Radar Bomb Scoring Group will be transferred from Carswell AFB, Tex., to Barksdale AFB, La., early next month.

Proficiency Testing

Cycle 3, Phase 1 proficiency testing will be accomplished during the current month. As usual, Air National Guard and Air Reserve personnel will be allowed to take the test at any time during the month. Active-duty airmen at overseas stations will be tested during the period July 3-8. Stateside members of the Regular establishment will have the exams made available to them during the period July 10-15.

Affected career fields total 21 and include Photomapping (22), Photographic (23), Weather (25), Radio-Radar Systems (30), Armament Systems Maintenance and Gunner (32), Training Devices (34), and Intricate Equipment Maintenance (40).

Also Metalworking (53), Construction (55), Fire Protection (57), Fabric, Leather and Rubber (58), Marine (59), Procurement (65), Accounting and Auditing (67), Statistical, Analysis, Data Processing and Programming (68), Administration (70), Information (72), Special Services (74), Education and Training (75), Air Police (77), and Aircrew Protection (92).

Reunion

Toledo, Ohio, will be the site of the 11th Bomb Group's annual reunion next month.

Scheduled for August 19 and 20, the call has gone out to all former members of the group who served between the dates of 1940 and 1945. Subordinate units which are included are the 14th, 26th, 42nd, 98th, and 431st Bomb Squadrons, 50th Reconnaissance Squadron, and Headquarters Squadron.

Details may be obtained by writing to Robert E. May, 13000 Eckel Junction Road, Perrysburg, Ohio.

HE TOLD THE WORLD. Altheus Drinkwater, left, 85-year-old retired telegrapher, flashed the news of the Wright brothers' success from Kitty Hawk, N. C., after witnessing the historic first flight nearly 58 years ago. Shown here with Maj. Gen. W. T. Hudnell and retired Gen. Carl "Tooey" Spaatz, USAF's first chief of staff, Drinkwater was a guest at the recent annual meeting of the Order of the Daedalians at Kelly AFB, Tex. The order is comprised of WW I pilots and their descendants.

Paint Job

Air Force aircraft will soon be showing a new face to the world—but not solely for beautification purposes.

A special paint, technically identified as polyurethane coating, has been developed in the Aeronautical Systems Division labs at Wright-Patterson AFB, Ohio.

Designed primarily as a protective coating against nuclear blasts, the application is the purest white yet developed which will retain its original brightness. In addition to affording protection against nuclear radiation, it also resists heat, moisture, synthetic lubricants, hydraulic fluids, and thermal radiations.

Service-tested for more than a year, the paint has proven most satisfactory under adverse conditions. Technicians also point out that its application will help in prolonging the life of metal parts through its ability to reduce heat wear generated during normal operating conditions.

Specialized Assignments

USAF officials have re-emphasized the constant and continuing requirement for selected airmen for assignment to a number of overseas special activities and units.

Because of the various special aspects of the missions and functions of these units, a high degree of selectivity is required in their manning. For this reason, it is desirable to identify and maintain a large resource of interested and qualified airmen from which to choose.

Nearly all requirements are filled from applications (AF Form 109) on file at Headquarters USAF. A wide variety of AFSCs are used and applications by qualified airmen are encouraged. Application procedures are outlined in Chapter 9, Part Two, AFM 35-11.

In processing these applications, every effort is made to satisfy individual desires regarding type of assignment and country or area of choice. Such ideals are not always readily possible and selection for assignment to other activities may occur.

Selection for special assignment is highly competitive in nearly every eligible specialty. They are made on a best-qualified basis and submission of an application does not guarantee selection.

Applications may be submitted by qualified airmen in any skill but the most urgent requirements currently exist in selected fields as indicated in the following list. However, personnel officials continue to stress the need for applications and assure that all will receive detailed attention.

Currently, applications are being urgently sought in the following AFSC for Air Attache duty: In the grades of staff, tech, and master sergeant with AFSC 23250/23270; from staff and tech with 29151/29171; from staff and tech with 29352/29372B; from staff and tech with A43151/43171A; from staff and tech with 64650/64670; from staff, tech, and master with 67150/67170; and from staff, tech, and master with 70250/70270.

Personnel possessing the following listed grade and AFSC are immediately needed to apply for MAAG and Mission duty: staff, 29352; tech and master, 30372; tech and master, 43171C; tech and master, 64570; tech and master, 64670; and tech and master 43470.

Opening also currently exist for applications for assignment to Allied Command, Europe. Thirteen AFSCs fall within the "urgently needed" category for airmen first class and staff sergeants. These include 29150, 29151, 30450A, 30453/30473, 30470, 30650C, 70450/70470, 47151, 60350/60351, 62250, 62450, 70250, 77150. Additionally, tech sergeants are also categorized as "urgently needed" in the 30453/30473 and 70450/70470 career fields.

Local personnel officers will be able to explain particulars to interested applicants.

MAJOR LEAGUE BASEBALL is rapidly nearing the halfway mark of the '61 season, but USAF enthusiasts at the top of the world are just finishing their spring tune-ups. Here, members of the 924th AC&W Squadron, Saglek AS, Labrador, get in their licks. Red baseballs are among the innovations used on the snow-covered diamond. Pitchers are aided by 80-m.p.h. winds. And 1,800-foot homeruns are possible—over the cliff and straight down into frozen Saglek Bay. No scouts have been reported.

Air Age Library

Professional Reading

Martin Caidin has authored an excellent study of USAF's jet precision team entitled *Thunderbirds!*. He reveals why the team is a magnificent personification of American airpower. (E P. Dutton and Co., $4.00).

Project Vanguard was written by Kurt R. Stehling, head of the project's Propulsion Group, and brings the program's history up to date. (Doubleday, $4.50.)

Related Reading

Maj. Alexander P. de Seversky has written what is described as a "blockbuster" in his *America: Too Young to Die* (McGraw-Hill, $4.95). He has built his warning of peril to this nation's future around three themes.

The International Geophysical Year (IGY) is the subject of Walter Sullivan's *Assault on the Unknown* (McGraw-Hill, $7.95). Sullivan summarizes the achievements of the "18-month year" which began on July 1, 1957.

Space

L. V. Berkner and Hugh Odishaw have compiled a series of 20 articles by outstanding authorities indicating the many ways in which science can use space for research and exploration in *Science in Space* (McGraw-Hill, $7.00).

Paperbacks

ABC of U.S. Military History, John W. R. Ransom, Sport Shelf.

World Famous Thrilling Exploits of Escape, Elizabeth Fowler, Hart.

The Big X, Hanks Searls, Dell.

Shoulder the Sky, George Leonard, Berkley.

Five, Four, Three, Two, One—Pfftt, William Anderson, Ace.

History of the German General Staff, 1657-1945, Walter Goerlitz, Praeger.

National Security in the Nuclear Age, edited by Gordon B. Turner and Richard D. Challmer, Praeger.

Goals for Americans, President's Commission Report, Spectrum, Prentice-Hall.

Thunderbirds!, Martin Caidin, Dell Original (see above).

Project Mercury, James J. Haggerty, Jr., Scholastic.

Kriege, Kenneth W. Simmons, Hillman.

The Mig Killers, A2C Arnold J. Buttner, Fugi Printing Co., Tokyo, Japan.

On the Beach, Nevil Shute, Signet.

The Great Escape, Paul Brickhill, Crest.

Strategy for Peace, John F. Kennedy, Popular Library.

You Ask It

I am about to retire and would like to know if Congress passed any special "peacetime-GI" benefits?

Any VA office can give you particulars on the benefits which are currently available. However, if you have reference to proposed education, home loans, and similar legislation which would correspond to wartime GI bills, no action has been taken.

What are the eligibility requirements for education or training under the Korean GI Bill?

At least 90 days active service, a portion of which must have been between June 27, 1950 and January 31, 1955, and discharge or separation under conditions other than dishonorable.

Am I correct in the assumption that specific dates have been designated for both WW II and Korea with regard to establishing eligibility for VA hospitalization?

Yes. For WW II, the dates are December 7, 1941 through December 31, 1946; for Korea, as indicated in the preceding question.

Would I write to the VA to have an error in my service record corrected?

No. Such application must be made directly to the branch of the service in which you served.

Is this also true of questions on mustering out pay?

Yes.

Before I retired, I designated one beneficiary for my GI insurance policy. Is it now possible for me to change this designation?

A GI policyholder may change his beneficiary at any time. However, be certain that you notify VA of your intent. Any office will be glad to assist you.

My husband, who had no wartime service, recently passed away. Will our children be eligible for benefits under the War Orphans Education Program?

A recent change in this law may include them. If your husband's death was attributable to service-connected injury or illness, you should contact the VA and have them decide on their eligibility.

As a WW II veteran who has never utilized my GI loan benefits, is it still possible to qualify?

The expiration date for WW II GI loans has been established as July 26, 1962. In short, VA must receive your application from a lender before that date.

I hold a part-time job after duty hours. If I am disabled or killed on that job, will this affect my compensation eligibility?

No, providing you are not at fault. In the event of disability, you would become eligible upon separation.

In the Name of Congress

No. 34 IN A SERIES

MAJ. LOUIS JOSEPH SEBILLE

The shooting in Korea had been underway less than two months when a veteran USAF pilot gave his life—in a new war, for a new flag.

THE U. N.'S FIRS

LOUIS JOSEPH SEBILLE seemed destined, from the very outset of his military career, to be among those who were always at the head of the line.

World War II was less than two weeks old when he enlisted as an aviation cadet in Chicago, Ill. In mid-1946 he was among the first WW II veterans who were recalled to active duty. And when the Korean conflict erupted, he was also in the vanguard of USAF members rushed into action to stem the southward-flowing Red tide.

In every instance he distinguished himself through his willingness and above-average ability. Louis Sebille lived a hero and died a hero—always in the van.

Sebille's military career began on December 20, 1941, when he was called to active duty as an aviation cadet. Unlike most of his contemporaries, the Michigan man barely qualified, narrowly sliding in under the age limit for the flying program. When he began flight training he was already two months past his 26th birthday.

However, from this point forward, Sebille was destined to be distinguished primarily through his leadership and inspirational abilities.

In July 1942 Sebille graduated from flight training and was commissioned in the Reserve. Less than six months later he was ordered to the European Theater as a member of the B-26-equipped 450th Bombardment Squadron, 322nd Bomb Group.

Flying from England, he underwent his baptism of fire and, within months, Lieutenant Sebille scored one of his patent "firsts." He was a member of a crew which participated in USAF's first B-26, low-level attack on the Axis-held mainland.

His demonstrated abilities soon destined him to assume the duties of flight leader and, before his European tour ended, Major Sebille had completed 68 combat missions with more than 225 combat hours.

During this period his decorations included the Distinguished Flying Cross with an Oak Leaf cluster and the Air Medal with 11 Oak Leaf clusters.

The citation which accompanied his second DFC provided a clear-cut clue to his skill and daring. Ironically, the action bore an amazing likeness to the feat which he would accomplish more than five years later and which would earn him this nation's highest award.

For extraordinary achievement in aerial flight against the enemy. On 22 February 1945, he led a flight of B-26 type aircraft on a maximum effort raid directed against enemy transportation. Upon completion of the bombing attack which completely devastated a railroad bridge and moving train, he led his flight in a strafing attack upon rolling stock and railroad supplies. With drive and thoroughness and devotion to duty, a marshalling yard was laid waste as his inspired flight followed him through intense antiaircraft fire. His tactical skill and courage reflect highest credit upon himself, his Group and the Army Air Forces.

Less than two weeks later he returned to the United States and was shortly ordered to the Command and General Staff School at Ft. Leavenworth, Kans. In August WW II ended, and, in November, Major Sebille returned to civilian life.

Eight months later the veteran flyer was back in uniform, recalled to resume his flying. For the next two years, he shifted from assignment to assignment covering almost the length and breadth of the United States and piling up experience in a variety of aircraft. Included in these many assignments was a session at the Air Tactical School, Tyndall AFB, Fla., and among the many aircraft he mastered was the famed F-51 *Mustang*.

By August 1948, when Major Sebille was ordered to duty with the 13th Air Force at Clark AFB, Philippine Islands, his logbook showed nearly 3,000 hours in the air. His initial assignment at Clark was as Base Operations Officer but, in November, he succeeded to command of the 67th Fighter-Bomber Squadron, 18th Fighter-Bomber Group.

As if sensing the inevitable, Major Sebille trained his newly-acquired squadron intensely. Through the next 18 months the political situation in the Far East deteriorated visibly, and the tension that existed between

SIR HERO

by SMSgt. HAL BAMFORD

the Communist and Democratic worlds continually increased.

Through these same 18 months the new commander faced an even more complex problem. Soon after he assumed command his unit began converting to F-80s, without benefit of T-33s for transition.

Then on June 25, 1950, North Korean, Red-dominated troops spilled across the 38th parallel and launched an attack on their South Korean brothers. Two days later, President Harry S. Truman, answering a U.N. call for aid to the beleaguered South Koreans, ordered American air and naval forces to intervene.

In order to comply with the Presidential order, the 67th was ordered to reconvert to F-51s and absorb many former pilots who had been grounded by a Department of Defense economy wave.

As testimonial to Sebille's leadership, despite the myriad complications, the 67th Fighter-Bomber Squadron landed within a month at Ashiya AB, Japan, combat-ready.

Almost immediately they swung into action in support of the hard-pressed forces battling the invasion. Evidence of the rigid training routine which their commander had demanded was quickly manifested. And time after time it was their battle-hardened leader who led the way.

Relentlessly, superior Communist forces pushed deeper and deeper into the peninsula. Grudgingly, stubborn ROK forces gave ground before the onrushing northerners. And ceaselessly, American air units droned over Korea, unloading their death and destruction on a multitude of enemy targets.

Collectively, the toll of constant combat began to tell upon the overworked Air Force pioneers in this new and unknown theater. Still they maintained their relentless pace until help could be dispatched.

On August 5, with the war in its forty-first day, Major Sebille again took personal command of a flight of these Japan-based F-51s. The assignment was a strike against a concentration of enemy troops, artillery, and armored vehicles in the vicinity of Hamchang, Korea.

The citation issued on July 31, 1951, graphically relates the story of the gallant leader's part in this crushing raid.

Major Sebille distinguished himself by conspicuous gallantry and intrepidity at the risk of his life above and beyond the call of duty near Hamchang, Korea, on 5 August 1950. During an attack on a camouflaged area containing a concentration of enemy troops, artillery and armored vehicles, his aircraft was severely damaged by antiaircraft fire. Although fully cognizant of the short period he could remain airborne, he deliberately ignored the possibility of survival by abandoning the aircraft or by crash landing and continued his attack against the enemy forces threatening the security of friendly ground troops. In his determination to inflict maximum damage upon the enemy, he again exposed himself to the intense fire of enemy gun batteries and dived on the target to his death. The superior leadership, daring and selfless devotion to duty which he displayed in the execution of an extremely dangerous mission were an inspiration to both his subordinates and superiors and reflect the highest credit upon himself, the United States Air Force and the Armed Forces of the United Nations.

In later interrogation, his wingman indicated that the gallant flyer dove straight into the blazing ground guns with all his guns firing and crashed directly in the midst of a group of armored vehicles.

His Medal of Honor, USAF's 44th, was the first awarded to a member of the Air Force in Korea and the first to be attained by a member of that service after gaining autonomy.

Throughout his long career, Major Sebille had earned a reputation which reached nearly legendary proportions and which lived long after his final mission.

This "FIRST DISCOVERER" blazed the scientific trail which men still pursue with satellites and probes, in quest of a better knowledge of the atmospheric bubble which encapsules our planet.

He Started...

by WILLIAM A. KINNEY, Airman Staff

WHO WAS HE? Dr. John Jeffries, a physician from Massachusetts.

What did he do? He made the first airborne investigations of the nature of the atmosphere.

When? November 30, 1784.

Where? His initial flight took him from London to Dartford in England's County of Kent.

How? In a balloon, that new and relatively untried vehicle for air travel which its inventors, the Montgolfier brothers of France, had first successfully sent aloft in public only a year earlier.

Results? Quite apart from noteworthy scientific findings, the initial flight, and one to follow, gave us the first book on aeronautics and research aloft written in the English language.

The flight which began scientific research in the atmosphere took Jeffries to a record altitude of 9,309 feet. If this seems a negligible height by 20th century standards, let us remember that the late "Hap" Arnold won acclaim when he set an altitude record of 6,540 feet for powered aircraft back in 1912.

Of course, before this Jeffries venture, there had been a scattering of other balloon ascents, mostly in France. Some were of the "captive" variety, with the balloons tethered to the ground by long ropes. A number were unmanned. Free flights were of short duration, in the main, ranging from a few minutes to half an hour. Only low to moderate altitudes were courted. For the public, ascents had the exciting element of a circus spectacle about them. To the cynical, the balloon was a novelty in aimless search of practical usefulness.

It remained for Jeffries to demonstrate, however, that man now had at his disposal a means enabling him to explore the airy realm above the earth in order to learn something about its nature—a subject which had piqued human curiosity since the most primitive times.

"The success of the first attempt naturally struck everyone with surprise," wrote the doctor, because he had done the "impossible" by returning with "visible and unquestionable proofs" to back up his discoveries and observations.

Modestly deprecating his role and "the general applause bestowed on *the first discoverer*" (as he was hailed), Jeffries sought to dampen prevailing optimism that a sudden cascade of scientific advances was already at hand. Nevertheless, he gave it as his firm opinion that the research discoveries of his flight "might lead at least to a full investigation of the nature and properties of the atmosphere which surrounds us, and into which we had hitherto been unable to rise much above the surface of the Earth." His conclusion has proven most prophetic.

This Man From Boston

John Jeffries was born in the capital of the Bay State, February 5, 1745. As a youth he proved a brilliant student, taking first honors when he graduated from Harvard in 1763, and already set on becoming a physician. He did extensive "reading" on medical subjects under the tutelage of a noted local practitioner, then went abroad in 1768 to complete formal studies in England and Scotland. The University of Aberdeen gave him his M.D. degree in 1769.

Returning quickly to Boston, he hung out his shingle and soon had a flourishing practice. The political climate in the Colonies, however, had been changing ominously during his absence abroad. By chance, the year of his departure had coincided with the arrival of British troop reinforcements to cope with incipient unrest. Thereafter, conditions deteriorated at a more rapid pace. The Boston Massacre of 1770 held a grim portent of the gathering storm.

Jeffries then perceived that major trouble was inevitable and he confronted a dilemma. Personally, he was an unwavering loyalist by conviction—about one out of every three persons in the Colonies espoused like sentiments. In the young doctor's case, however, the issue was more distressful because his father, David Jeffries, Boston's treasurer for almost three decades, was an ardent patriot.

The physician could only make the painful decision his conscience dictated; his fealty belonged to the Crown. Nor did he temporize until the explosion of the Revolution to show his colors. In 1771 he obtained a medical officer's commission to serve with His Majesty's forces. During the next nine years he saw duty afloat and ashore, both with combat units as well as in military hospitals.

Yorktown was still a year away in 1780 and Jeffries was attached to British forces campaigning in the South when word came of his wife's death in London. Given permission to resign his commission, he went to England to care for his three children there.

Expatriate—Pro Tem

Dr. Jeffries settled down in London, to all appearances as if he expected to spend the rest of his days there. A civilian once more, the ex-colonial returned to the private practice of medicine and with lucrative results.

But the physician had a restless, inquiring mind which ranged beyond matters of particular interest in his own field of medicine. Almost instinctively, he gravitated into the company of men engrossed in the wide study of other physical sciences and given to discussing how greater knowledge of these subjects might be gained.

Among his new acquaintances were a number of members of the famed Royal Society, founded in 1662 for the purpose of "Improving Natural Knowledge" and distinguished for the long list of brilliant scientific names on its rolls since the time of Isaac Newton.

News from France about the Montgolfiers' invention of the balloon in 1783 stirred the Boston doctor's imagination to speculate about the possibilities there might be in levitation or aerostation, the contemporary words for ballooning.

Then the inspired idea seized him. Why not utilize the new vehicle for research in the unknown environment aloft and there ascertain "the state and temperature of the atmosphere at different heights from the earth?"

Perceiving the challenge, he declared: "I became anxious to contribute my mite toward these important discoveries. His Royal Society friends mustered their expert help to make that "mite" a significant scientific enterprise.

As they discussed plans, Jeffries turned with some misgivings to the business of lining up for the flight a balloon and balloonist, both currently in shortest supply. He sought out Jean Pierre Blanchard, a "veteran" aeronaut with four or so successful ascents (and descents) to his credit.

At first the French balloonist gave pleas for cooperation a frigid reception, but his attitude thawed magically "in consideration of 100 guineas presented him" out of the doctor's own purse. That was a goodly sum of money for the day.

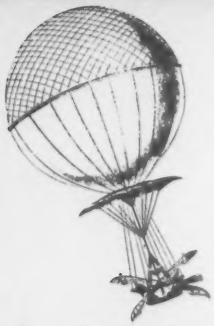
With M. Blanchard's signature on a contract, Jeffries became the discriminating shopper for instruments. A compass and chronometer were obvious items. He also equipped himself with a good telescope. For checking on the water vapor in the atmosphere, he bought a hydrometer and next an electrometer to register any electrical phenomena the flight might encounter. The thermometer he chose had dual scales, one in the familiar Fahrenheit readings, the other with the now little used Reaumur gradations.

Selection of a barometer gave him the most thought. At sea level under standard pressure the mercury in the instrument's tube stands at 29.92 inches. Readings at terrain above sea level had indicated the mercury would drop about one inch with each additional 1,000 feet. However, air pressure was a variable factor even at sea level, and Dr. Jeffries had no certainty what its behavior and effects might be far aloft. Averse to taking chances with barometric readings, he had an instrument specially built—with graduations down to 18 inches, an unheard of thing!

The Great Day

Our would-be research aeronaut first expected to make the flight in fine autumnal weather, but the odds were stacked against him. There had been two earlier balloon ascents in the London area, both resulting in personal and property damage, plus other "mischief." The bad psychological effect of these previous ventures came home harshly to Jeffries as soon as he began seeking permission to use open, unobstructed grounds for a take-off site. He met with nothing but rebuff after rebuff from uncivil landowners.

Almost as a last resort, the Boston doctor succeeded in settling for the use of the central court or yard of a city block, known as the Rhedarium. Hemmed about by stables and other structures, this cramped rectangle offered an area of only some 400 square feet, and a



more dubious launch site would be hard to find. (*See map illustration.*)

Monday, November 29, 1784, was ultimately fixed for take-off, only to be vetoed by "uncommonly tempestuous" weather. The next day dawned none too promisingly and long delays in inflating the balloon heightened uncertainty. But this was to be *it*.

While the balloon slowly filled, Jeffries rigged his instruments along the inner side of the "Aerial Car," or basket. The barometer stood at 30 inches; the temperature read 51 degrees F., and the hydrometer was purposely set at zero.

Although the cramped dimensions of the take-off area were never meant to accommodate a gallery, a sizeable assemblage of nobility had gathered for the occasion, among them the Prince of Wales, himself, and the Duchess of Devonshire, a reigning beauty. Outside, curious commoners thronged the streets.

Jeffries evidently was too absorbed by his preparations in the balloon's basket to have thought for the audience and amenities. M. Blanchard stepped into the breach and took it upon himself to pay their joint respects to Wales and the Duchess. In return, Her Grace presented the balloonist with the standard of her House to carry on the voyage. An odd quirk this brief ceremony held; it was from Plymouth in Devonshire that the *Mayflower* braved the Atlantic on the voyage which brought the founding Pilgrim fathers to Jeffries' native Massachusetts in 1620.

That the French balloonist received the Devonshire banner slighted the doctor from Boston not in the least. Jeffries already had provided himself, as he pointedly mentioned in his flight report, with "an handsome British Flag (invidiously misrepresented the next day, in one of the public papers, to have been the Flag of the American States)."

Who can read that parenthetical slap at invidious "misrepresentation" by the press, and still have doubts that the doctor was still the staunch loyalist, still very much the King's man?

The actual ascent had its touch-and-go moments. The balloon started upward very sluggishly, so much so that Blanchard concluded he had too much ballast aboard.

To remedy this, the balloonist maneuvered to a landing atop stables at the north end of the Rhedarium where excess ballast was jettisoned. The balloon, however, now lacked the protection from the winds which surrounding buildings had afforded it at launch. The car swept across stable roofs, tumbled off at their west end and narrowly missed crashing into some nearby structures. More ballast went hastily over the side and the balloon began to climb, if not fast enough to keep its car from shearing off chimney tops of several houses. Then the crisis was over.

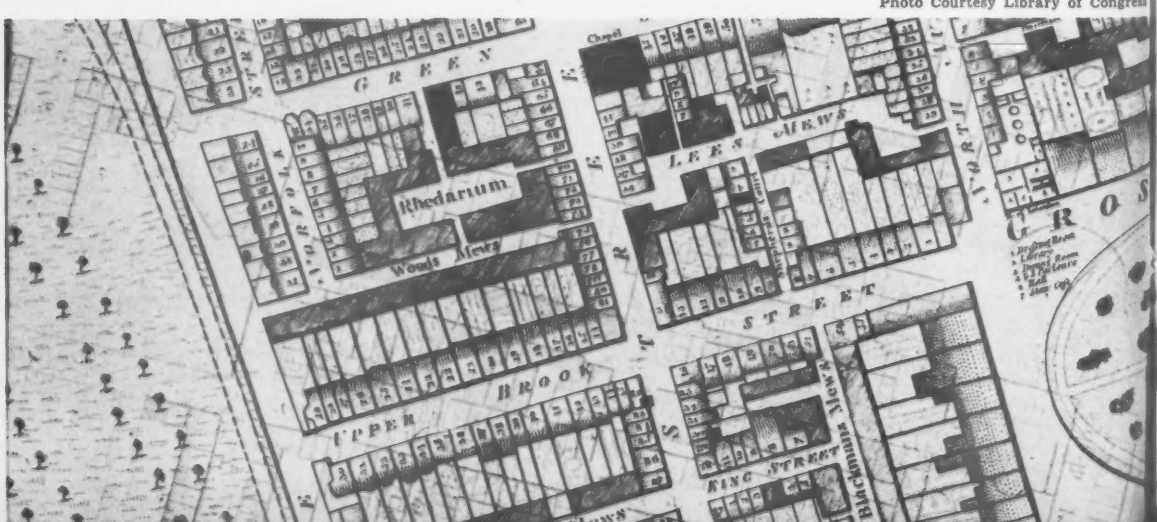
". . . at 38 minutes after two, we rose above the reach of any farther terrestrial obstructions," Jeffries methodically recorded.

The two men in the basket waved their flags in a parting salute to the awed throngs below. The physician was struck by the "magnificent view" which increasing altitude brought. He felt a surge "of joy and exultation,

LAUNCH SITE: A late 18th century map of London conveys a graphic idea of the Rhedarium's cramped inner court whence the Jeffries' flight ascent began. Dark hatching marks the numerous stables surrounding the area. Lighter subdivisions of the block are houses and yards. Site's proximity to Grosvenor Square (right) seems a happy historical accident, for the Square has since been closely linked with Anglo-American relations. In 1785, future President John Adams took residence there as our first Minister to Britain and the U. S. Embassy is still located on the Square today. It was also the place chosen for the memorial statue of FDR, which stands as U. K.'s tribute to our WW II Chief Executive.

The Rhedarium's name stems from a Latin word for four-wheeled chariot, cart or carriage. The fact that Hyde Park, a favorite riding place, is so close by evidently accounted for this concentration of stables or coach houses within easy distance.

Photo Courtesy Library of Congress



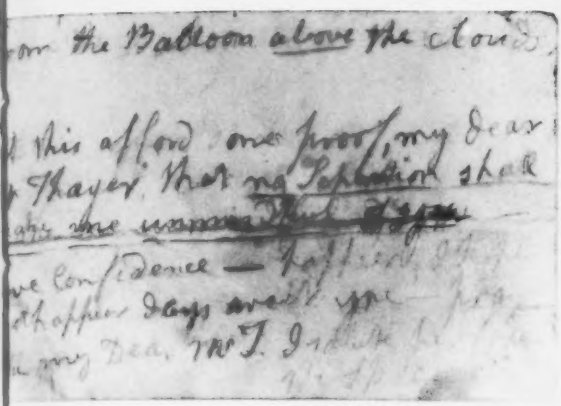


Photo Courtesy of Amherst College with the cooperation of National Archives.

THUS BEGAN AIRMAIL, 1784 A.D. Reproduced above, the first time, is a recent restoration of the only message now known to survive from the four which Dr. Jeffries wrote to friends while aloft on his historic balloon flight to pioneer atmospheric research. The notes were "posted" by being dropped from the balloon's basket as it climbed to a peak altitude of 9,309 feet.

This surviving message was addressed to a Mr. Arodie Thayer and later presented to Amherst College by a nephew, Thatcher Thayer, a member of the class of 1831 there. The document, now preserved in Amherst's Snell Museum of Physics, measures 3⅛"x4¾".

Badly faded, stained and otherwise impaired, the original document posed numerous problems for restoration experts at National Archives in Washington, D. C., to whose painstaking efforts THE AIRMAN is much indebted for the partially legible reproduction of the message which could be obtained by the most modern methods and equipment, without resorting to techniques which involved possible risk of damage to the note.

The original message, the experts believe, was written in an ink made from pokeberries and widely used at the time of the flight. This ink will start fading relatively fast. After the writing had grown dim and, in places, less than legible, some individual in the past sought to preserve the note's text by tracing over Dr. Jeffries' script with lead pencil. Where words or phrases evidently had become almost indecipherable, this individual seems to have guessed at what the wording was originally and his surmises were not always correct.

After much study of the reproduction under magnification, the first part of the message, as penned by Jeffries, appears to have read thus:

from the Balloon above *the clouds Let this afford some proof, my dear Mr. Thayer, that* no Separation *shall make me unmindful of you—have confidence—happier, I hope, much happier days await you—pray tell my Dear Mrs T. I salute her from the Skies.*

The second portion is too indistinct for deciphering with any sustained accuracy until the word, "pleasure," before the closing subscription: "*. . . believe me, as I ever have been, yours faithfully and affectionately—J. Jeffries.***" As for the obscured writing beneath the signature, the occasional letters, syllables or words discernible appear to be in Jeffries' hand. It is impossible to tell, however, whether these lines represent a postscript written aloft, or something in the nature of an endorsement added after the flight when Thayer showed Jeffries the note had been delivered.**

at having at last overcome every obstacle, and become free . . ." The elation and detachment of spirit, he wrote apologetically, were "not easily described"—words so similar to those invoked by modern aeronauts after experiencing what we now term the break-off phenomenon.

Despite the risky character of the ascent's start, then the thrill of being airborne for the first time, with the almost hypnotic attraction of the widening scene which London presented beneath him, Jeffries was not to be distracted. "I found myself perfectly collected," he wrote, "and began to attend solely to my first object . . . I had so many instruments to attend to."

The compass he soon passed to Blanchard and concentrated on monitoring the instruments which meant most. In both thermometer and barometer, the mercury began to drop. The sky into which the balloon climbed was cloudy, with murky patches of high fog. The ground, meanwhile steadily receded, until it seemed, in Jeffries' words, "to be falling from under us into some other world."

Then the balloon passed through a cloud field, "a lovely azure blue above us opening a very extensive prospect in all directions . . . the rays of the sun appeared very beautiful in their course . . ."

At 2:55 p.m., Dr. Jeffries emptied distilled water from a small vial, took his first air sample, and carefully recorked the container. This process he repeated as the balloon reached greater altitudes, until all seven vials in his kit had been filled with samples.

As the flight progressed Jeffries had occasional free time from his programmed schedule. During such intervals he "amused" himself by dashing off notes, four in all, to friends. This air mail went over the basket's side, a handkerchief attached to each piece to attract attention. The doctor was pleasantly surprised to learn later that three of the notes had been picked up on the ground, "kindly forwarded, and received by those to whom they were addressed."

Shortly after 3 p.m., successively higher altitudes were being attained. Blanchard, complaining of the cold, pulled on a heavy cap. Jeffries, preoccupied with his observations, seems to have been oblivious that he might be feeling cold himself until Blanchard spoke.

The physician's first thoughts were for "a little dog I had taken with me." He saw the animal had "crumpled himself up at my feet, and began to shake and shed tears with the cold."

After compassionately caring for his "little dog," Jeffries realized that he himself was cold, bitterly so. His ears pained, and there was a ringing in them. Following Blanchard's example, he then donned "a fur cap, which in a great measure relieved me." Quite a swank flight helmet, that fur cap; it was of leopard skin and smartly styled.

The onset of savage cold had struck abruptly. In two minutes the mercury dove from a tolerable 29 degrees to zero. In the next two minutes it rebounded to 28.5 degrees, then before another minute elapsed it plummeted to zero again. These thermal gyrations occurred as the balloon approached maximum altitude, which calibrations determined as 9,309 feet.

Here was the moment of triumph, the attainment of airy heights never before reached by mere mortals, but Jeffries' matter-of-fact account makes it seem almost routine. The same holds true for the descent, except for the final few minutes which brought what he considered "the only real danger" of the whole trip.

After gas was valved off to start down, he and Blanchard first "refreshed ourselves with cold chicken, and drank a few glasses of wine to the health of our friends below us."

The flight ended at 3:59 p.m., on a marshy stretch of ground near Dartford. Dr. Jeffries calculated the airborne duration of the trip as one hour and 21 minutes.

Like the takeoff, getting the balloon back to *terra firma* brought a succession of tense moments. Grappling anchors, dropped to arrest progress, failed to hold in the soil. The basket buffeted its way roughly through tree tops, with much damage to the primitive steering equipment. Jeffries even strove mightily to halt further forward motion by grabbing big limbs, only to have them quickly torn from his grasp. Finally, enough people of the locality ganged up on the trailing landing ropes to bring the balloon down.

For this amateur ground crew, the occasion's prize souvenirs were morsels from the provisions uneaten in the flight. Jeffries found himself dividing leftover bread and chicken "almost into atoms among them; every one being eager to get some of that food which they had seen literally descend from the clouds."

As for himself, the physician felt both fatigued and feverish, conditions which he attributed to the severe cold at peak altitude and his more recent struggle of wrestling with the tree limbs. However, he reported, "a bowl of warm tea set me right, and I felt no further inconvenience than the soreness of my arms." All his instruments escaped damage; the only breakage loss was an air-sampling vial.

Back in London the next day, Jeffries began drafting his report to the Royal Society on the results of the first investigation of atmospheric phenomena personally conducted by man above the earth's surface. Subsequent analyses by the Society's experts of the data collected graded his work highly, and the scientific values it helped establish have since proved to agree closely with those found by modern methods.

Even before completing his paper on December 8, 1784, the doctor was keyed up with new anticipations. Already he had planning advanced for a second aerial venture, more ambitious in certain aspects than the first and certainly fraught with more peril. He could not possibly have foreseen then that at journey's end he would be thrown into the company of such men as Benjamin Franklin, John Paul Jones, John Adams, and other stalwarts of the American Revolution. Yet he found them unexpectedly congenial, and perhaps this sparked the mental reappraisal which ultimately brought this pioneer scientist of the upper air back to his native New England as Dr. John Jeffries, U.S. citizen.

(To be continued)

EXPANDING FRONTIER

How far does the atmosphere extend? At the time Dr. Jeffries went up for his scientific research in this gaseous bubble which capsules our planet, acceptable popular calculations were that, at maximum altitude his balloon reached, he had penetrated about a quarter of the air's extent above the ground. Successive discoveries since have pushed the theoretical end zone of the atmosphere steadily much, much farther out.

Standard textbooks, published just before the first artificial satellites, theorized the outermost atmospheric layer or region—the exosphere—would begin at between 500 and 700 miles. A few mentioned 1,000 miles as probable.

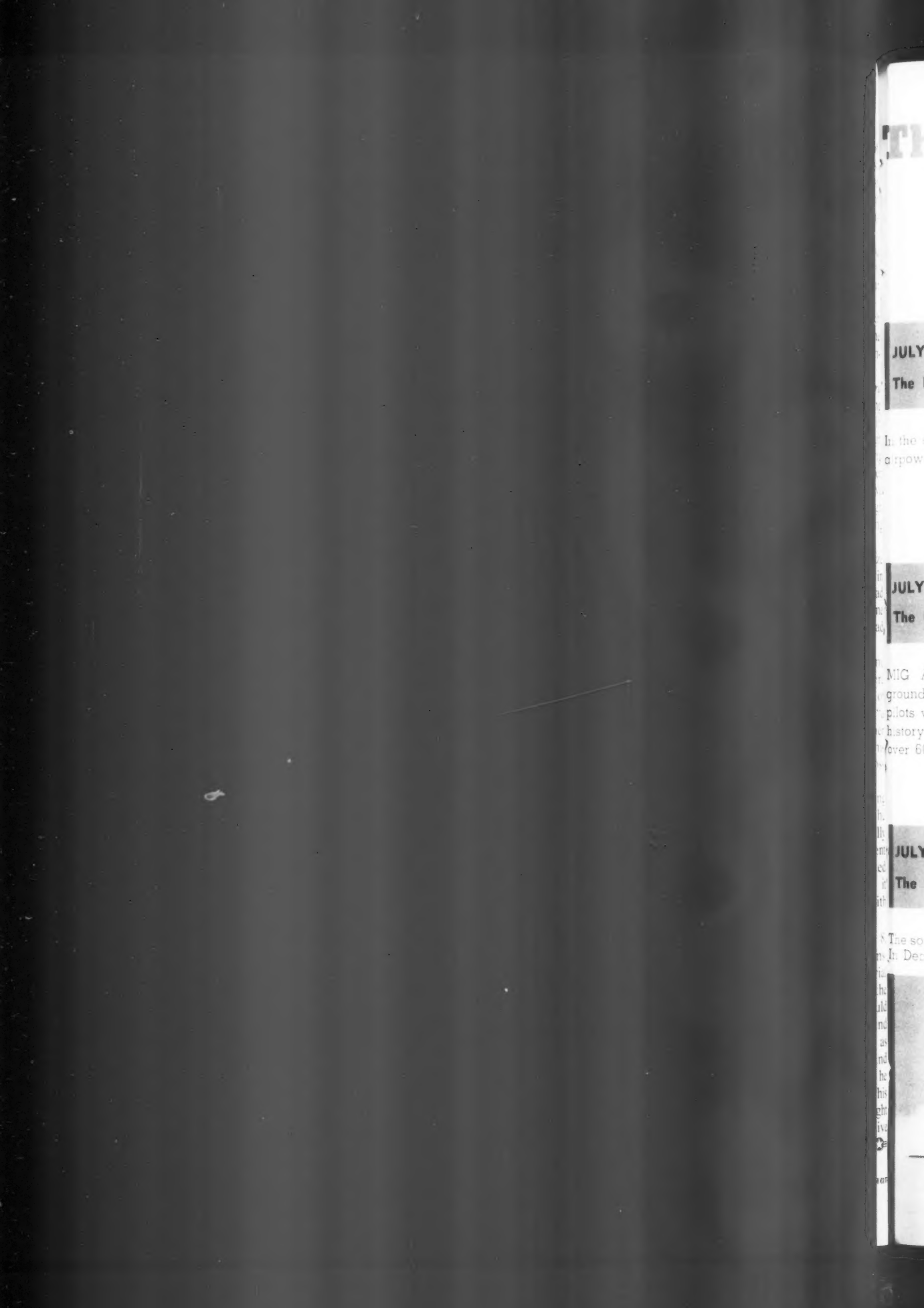
The first half of 1961 finds at least some scientists now thinking that the atmospheric frontier may be as distant as 60,000 miles from Earth. Air molecules in that boundary region, they say, would be extremely tenuous and widely dispersed but still identifiable as atmospheric components if adequate sampling can be obtained. Sophisticated space research vehicles of the future should develop evidence whether 60,000 miles or less will be fixed eventually by science as the arbitrary limits of the atmosphere.

Three Decades of Interceptors

In the summer before Pearl Harbor, the P-40 Curtiss *Hawk* was the foremost interceptor in U.S. airpower inventory. Top speed of the P-40 was 375 m.p.h.; normal range about 600 miles.

MIG Alley in Korea was the proving ground for the F-86 *Sabre* where Air Force pilots wrote a dramatic chapter of airpower history. Early A and E models had speed of over 600 m.p.h.; ceiling more than 40,000 ft.

The sophisticated interceptor of the '60s protects vital target areas in the United States. In December 1959 the F-106 established new world speed record of 1,525.9 m.p.h.



Three Decades of Interceptors

JULY 1941

The P-40 HAWK

In the summer before Pearl Harbor, the P-40 Curtiss *Hawk* was the foremost interceptor in U.S. airpower inventory. Top speed of the P-40 was 375 m.p.h.; normal range about 600 miles.

JULY 1951

The F-86 SABRE

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JULY 1961

The F-106 DELTA DART

The sophisticated interceptor of the '60s protects vital target areas in the United States. In December 1959 the F-106 established new world speed record of 1,525.9 m.p.h.

LIBERTY ENLIGHTENING THE WORLD

In 1886 the Torch of Liberty was raised over New York Harbor as a symbol of hope for "huddled masses yearning to breathe free."

The Torch of Liberty still shines in inspiration, providing a light to lead the way for new generations.